Taphonomic Patterns: can the effects of brush fire mimic the natural decomposition of heavy muscle markers on the surface of bone?

by

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Taphonomic Patterns:

Can the Effects of Brush Fire Mimic the Natural Decomposition of Heavy Muscle Markers on the Surface of Bone?

By: Tricia Allison Maria Fernandes

ABSTRACT

The goals of this study included: (1) examining if brush fires were capable of creating unique burn pattern signatures at specific stages of decomposition and (2) determining if mimicry of colour and taphonomic processes was possible between burned and naturally decomposed human remains. Pigs were burned at specific stages of decomposition with the use of a Tiger Torch and skeletal surface colour was measured with the use of a CR-11 digital colour reader. Results revealed: (1) there were no burn pattern signatures to describe heat related skeletal trauma for specific stages of decomposition and (2) mimicry of colour is possible between burned and unburned remains; however, it is unlikely to confuse the taphonomic mechanisms responsible for creating these surface patterns. This study will help investigators deduce the taphonomic patterns found on the surface of skeletal remains in order to determine information about a decedent's post mortem interval.

August 16, 2011

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1.1Taphonomy, Fire, and Forensic Investigation

Taphonomy is a field of science that studies the principles of deposition and the metamorphosis of a biological organism from its fleshed to skeletonized state (Deny 2002:469; Haglund and Sorg 1997; Haglund and Sorg 2002). Fernandez-Jalvo et al. (2002) describes taphonomy as a field of research that is continuously developing and identifying new mechanisms that may cause alterations to the surface and concentration of bone. Its primary focus is processes that leave residual patterns on the surface of bone. These processes include scavenging by animals and insects, transportation and mishandling, weathering, soil erosion, aqueous versus dry environments, burning and diagenesis (Deny 2002:469; Haglund and Sorg 1997; Haglund and Sorg 2002). Through comparative and experimental research, taphonomy has proved to be a valuable source of information for scientific disciplines especially forensic science.

In a forensic context, the degradation of a decedent from a fleshed to a skeletonized state translates into legal evidence. It provides information about the individual from their time since death to discovery (Adlam and Simmons 2007:1007; Byers 2005:107). Thus, it is crucial for forensic experts, such as forensic anthropologists and forensic pathologists, to have a strong understanding of taphonomy and experience in handling decomposed human remains. By possessing the skills to distinguish between injuries that were sustained ante mortem, peri mortem, or post mortem, experts may extract more information about a decedent to reveal the circumstances surrounding their demise and contribute to establishing their Post Mortem Interval (PMI).

Decomposition studies have documented the influence of agents on the PMI. These include: temperature, humidity, insect and animal activity, accessibility, human disturbance, and burial type (Adlam and Simmons 2007; Haglund and Sorg 1997; Haglund and Sorg 2002). These agents have been shown to act in a predictable manner to accelerate or impede the rate and sequence of decomposition. Fire, however, is a temperamental agent that interacts with the process of decomposition and taphonomy in a unique way.

When fire interacts with human remains, it is capable of utilizing subcutaneous fat as a rich fuel source and bone as a porous and rigid wick to sustain itself (DeHaan 2008; DeHaan et al. 1999; DeHaan and Nurbakhsh 2001). The longer a fire can sustain itself, the greater are its catastrophic and destructive effects on the human body (Glassman and Crow 1996). This creates complications for forensic anthropological analyses by obscuring identifying features and any potential evidence of criminal activity. More specifically, fire effects taphonomic analyses because it is capable of masking features or injuries sustained by a deceased individual ante mortem, peri mortem, or post mortem. It is because of these reasons that fire is commonly observed in forensic settings. Therefore, it is crucial for forensic experts, especially forensic anthropologists, to continuously expand their knowledge about the complex relationship between fire, taphonomy, and heat related skeletal trauma.

1.2 Current Research Objectives

Identification and visual classification research is one of six interrelated categories of thermal research. This thermal research explores and investigates the identification of heat-induced human remains and the analysis of macroscopic bone modifications (Symes 2008). Although substantial in its current contributions (Bohnert et al. 1998; Brain 1993; Brain and Sillen 1988; Buikstra and Swegle 1989; Christensen 2002; DeHaan and Nurbakhsh 2001; DeHaan et al. 1999; Glassman and Crow 1996; Hanson and Cain 2007; Holden et al. 1995; McCutcheon 1992; Nelson 1992; Nicholson 1993; Pope and Smith 2004; Shahack-Gross et al. 1997; Shipman et al. 1984; Stewart 1979; Stiner et al. 1995; Symes et al. 2008; Taylor et al. 1995; Thompson 2004; Thompson 2005; Thompson and Chudek 2007; Whyte 2001), this area of thermal modification research is still evolving to resolve the many unanswered questions that are being presented by modern fatal fire forensic cases.

The objectives of the current study are descriptive and twofold. The primary goal of this study is to determine if brush fires are capable of creating unique burn patterns at specific stages of decomposition. When a fully fleshed and unbound body is exposed to fire, at a specific duration and temperature range, the body takes on a heat-induced posture (Bohnert et al. 1997). This posture, also known as the pugilistic posture, is a heat related skeletal trauma model that illustrates natural burn pattern signatures on the surface of skeletal remains (Symes et al. 2008). Although the pugilistic posture can predict how fully fleshed human remains interact with fire, it cannot be relied upon to explain the interaction between fire and decomposed remains. The process of decomposition will not only effect the amount of viable biological fuel available to sustain a fire, but it also affects the degree to which tissue shielding will occur to protect the surface of skeletal remains. Tissue shielding and the pugilistic posture are compromised because decomposed muscles fibers do not possess the same physical strength or composition as living or fresh muscle fibers. Consequently, the current study seeks to investigate how human remains, at a fresh, advanced and skeletonized state of decomposition, interact with fire. To determine if brush fires are capable of creating unique burn patterns at specific stages of decomposition, this study will examine any resulting heat related skeletal trauma and describe any general trends about the thermal interaction and burn patterns.

The secondary goal of this study is to determine if the discolouration patterns present on the surface of thermally treated bones can mimic the staining patterns caused by naturally decomposing muscle tissue on the surface of skeletal remains. Past research has shown that macroscopic surface features, such as colour and texture, have been used to identify thermally modified remains (Bonucci and Graziani 1975; Brain 1993; Devlin and Herrmann 2008; Dunlop 1978; Hanson and Cain 2007; Holden et al. 1995; Munro et al. 2007; Nicholson 1993; Shahack-Gross et al. 1997; Shipman et al. 1984; Stiner et al. 1995; Whyte 2001). Although, black and ash-like staining are characteristics typical of burned remains, these are also commonly described features of unburned remains. For example, unburned remains that have mineral or organic staining have been reported to mimic colour changes in burned remains (Oakley 1961; Shahack-Gross et al. 1997). Similarly, the surfaces of skeletal remains that have been exposed to the elements resemble the surface texture of burned remains (Sillen and Hoering 1993; Stiner et al. 1995; Taylor et al. 1995, White 1992). Without specific information about the depositional context from which these remains were found, the visual assessment of their macroscopic surface features may otherwise be misleading (Thompson 2005; Symes et al. 2008). This creates uncertainty in the interpretation of these skeletal remains and warrants further taphonomic investigation.

Previous literature has used the term "mimicry" to describe the resemblance of macroscopic skeletal surface features between thermal, organic, and mineral staining (Hanson and Cain 2007, White 1992. The current author defines her use of the terms "mimicry" or "mimic" to describe the macroscopic surface features that exist between different taphonomic mechanisms that have sufficient resemblance to one another, such that they are difficult to distinguish. To evaluate the mimicry of colour and surface texture, the current study will explore the taphonomic effects of brush fires and weathering on skeletal remains. Surface colour will be measured and compared between burned and unburned remains, while the impact of colour and surface texture will be evaluated with the help of a forensic anthropologist and a medical examiner.

1.3 Relevance of the Current Study to a Forensic Case in Nova Scotia

The basis of the current descriptive study stems from a Nova Scotia Medical Examiner case that involved the recovery of found remains from a dumpsite in Nova Scotia. In the fall of 2008, the Nova Scotia Medical Examiner Service, in participation with the Forensic Identification Section of the Cape Breton Regional Police, recovered found human remains from a secluded and semi-wooded dumpsite. The remains were found as a surface scatter over a 100 m area and they were in a state of complete disarticulation and skeletonization. During the recovery mission, several dark staining patterns were noted on the surface of several skeletal remains. These staining patterns could not be readily attributed to fungal growth, soil interaction, or accounted for by intentional thermal treatment. Communication with one of the members of the Forensic

Identification Section on site, who was also the local fire Chief, provided insightful information about the general area surrounding the dumpsite. He informed the recovery team that the greater area had been subjected to several natural brush fires in previous years and seasons.

From this information, new questions arose from the laboratory analysis of the skeletal remains. The skeletal remains were identified as belonging to a young female who had been reported missing for a two year period prior to the discovery of her remains. Also, consultation with a botanist and mycologist confirmed the staining patterns on the surface of the skeletal remains were not caused by soil interaction or fungal growth. The question that now remained was what caused the dark staining patterns present on the surface of her skeletal remains? If brush fires had frequently occurred in the area where her remains were recovered, how could investigators be certain that the young female's body had been deposited there for the whole two year period that she was reported missing? Was it possible that her remains came in contact with the brush fires? If so, at what stage of decomposition were her remains exposed to the fire? Could it be possible that the staining patterns present on the surface of the remains were caused by the process of natural decomposition?

The objectives of the current descriptive study are relevant to this case study in Nova Scotia. The current study will provide descriptions about the stages of decomposition of a body when it was exposed to a natural brush fire in a wooded area. Similarly, this study will determine if brush fires and the natural environment are capable of creating similar staining patterns on the surface of skeletal remains, based on comparison of their surface colour and texture. Thermal research of this nature should be conducted in order to make more taphonomic information available to investigators and aid in the estimation of the post mortem interval.

Chapter 2: Literature Review

Forensic investigations reach new plateaus of difficulty when a human body has been subjected to an illegal cremation or suspicious contact with fire. In these fire investigations, a team of specialists comprised of fire investigators, medical death investigators, forensic pathologists, forensic anthropologists, and forensic odontologists, come together to work towards a common goal. They seek to understand and identify all circumstances surrounding a fire and to identify any fire victims involved. Instrumental to the investigation is determination of the condition of the body before exposure to fire and the cause and manner of death (Bonhert et al.1998:11; Eckert 1981: 347; Gruchy and Rogers 2002:1; Holden et al. 1995:30). The specific role of the forensic anthropologist, in any fire investigation, is to employ archaeological search and recovery protocols to heighten the preservation of recovered remains, to analyze and interpret skeletal remains, and to aid in the identification of unknown individuals. Fire becomes problematic to investigations because it makes it difficult to: 1) determine personal identification, 2) assess biological demographic information determined from morphological and metric techniques and 3) recover vital biological and behavioural evidence used to reconstruct the scene of a crime (Thompson 2005; Thompson and Chudek 2007, Symes et al. 2008).

The following is a literature review of information that is imperative to understanding the relationship between fire and the human body. This information is invaluable towards the development of the current study's methodology. This review explores the basic properties of fire and bodily combustibles, examines classification systems and a model used to define thermal modification, and assesses the heat-induced transformations in bone. This review expands upon the implications of heat-induced structural and colour changes and discusses their association with other taphonomic mechanisms that produce similar macroscopic surface characteristics. Lastly, since the current study seeks to evaluate the effects of fire on human remains in different stages of decomposition, this review will also survey past research that quantitatively and qualitatively defines stages of decomposition. The literature cited in this review will aid in correctly identifying, collecting, analyzing, and interpreting the data in this project.

2.1. Fire: Basic Properties and Characteristics

Fire is defined as an exothermic reaction between a fuel source and an oxidizer. Eckert (1981:349) reported that five elements are necessary for a fire to spread; these have been revised by DeHaan (2008:1) and reduced to four definitive requirements. These include: (1) a suitable fuel source in a gas or liquid form, (2) a continuous supply of oxygen, (3) thermal heat, and (4) the chemical oxidation that drives the reaction to proliferate. Fire is classified into two types: (1) flaming and (2) smouldering. Flaming fires are gas-gas reactions that are not only the most common form of fire, but, also, the most destructive. This form of flame is produced by a gaseous fuel burning in the presence of an oxygen supply. Smouldering fires are solid-gas reactions in which a rigid and porous solid is oxidized in direct contact with an oxygen supply. It is the incandescence on the surface of the fuel source that makes this form of fire visible to the naked eye (DeHaan 2008:1-2; Table 2.1).

Table 2. 1 Visual Colour Temperature of Incandescent Hot Objects (DeHaan 2008:1-2)

Colour	Approximate Temperature (°C)
Dark Red	500-600
Dull Red	600-800
Bright Cherry Red	800-1000
Orange	1000-1200
Bright Yellow	1200-1400
White	1400-1600

Fire flames are also categorized into two flame types, laminar and turbulent. Laminar flames are small in size, yet, they are comprised of overlying heat zones. Once laminar flames become too large, their structure transforms into a turbulent flame. Turbulent flames are sourced from fuel vapours that are produced from either a solid or gaseous fuel source. Turbulent type fires are most commonly observed in fireplaces, trash fires, structure fires, or wild land fires (DeHaan 2008:3).

Fuels, topography and weather govern fire behaviour in any wildfire. These three elements are best known as the Fire Spread Triangle (Ford 1995:11). This triangle influences the rate of spread, residual burning, re-burning, and burning intensity. In the current study, the effects of fuel sources were of most interest because various stages of decomposition were under investigation. Fuel sources will be primarily supplied by the vegetative brush surrounding the pig cadavers and by the three major combustible fuels of the body, which were tissue, fat and bone (Christensen 2002). The ignitability of these vegetative and biological fuels was dependent on their dryness, their physical character and their size (Ford 1995:11).

The power of a fire is measured in kilojoules per second (kj/s) and is formally referred to as the Heat Release Rate (HRR). Heat Release Rate is one of the most basic properties of fire and is used to estimate how fire interacts with fuel substrates (DeHaan 2008:4). When fire interacts with biological substrates, such as subcutaneous fat, soft tissue and bone, many factors must be considered to understand the intimate relationship that exists between them. Focus must be directed towards evaluations of: (1) the magnitude of the fire, (2) the contact with a human body, (3) the length of exposure, and (4) the condition of the human remains (DeHaan 2008:8).

2.2. The Interaction between Fire and Biological Substances:

2.2.1. Subcutaneous Fat as a Suitable Fuel Source

Studies have shown that subcutaneous fat is the best fuel source within the body to proliferate a fire (DeHaan 2008; DeHaan et al. 1999; DeHaan and Nurbakhsh 2001). Consequently, the degrees of combustibility and destruction of the human body are heavily influenced by the amount of body fat present (DeHaan and Nurbakhsh 2001:1081; Holden et al. 1995:30). For subcutaneous fat to be an effective fuel source, it must first be rendered and exposed to an oxygen rich atmospheric environment (DeHaan 2008:9). Fat is rendered by means of skin splitting and the process takes approximately 10 to 15 minutes of constant heat exposure before allowing the self-sustaining combustion reaction to proceed (DeHaan 2008:10). Skin splitting is the result of contracting forces that act on burned or charred skin that are weakened due to the heating process (Pope and Smith 2004:3).

Studies performed by DeHaan et al. (1999) and DeHaan and Nurbakhsh (2001) have analysed the combustion of subcutaneous pig fat to evaluate its implications for the consumption of human bodies in fires. DeHaan et al. (1999) have shown that pig flesh could be burned in a localized fire supported by the release of pig fat into a charred porous substrate (DeHaan and Nurbakhsh 2001:1076). The 16th Edition of the National Fire Protection Association Handbook (DeHaan et al. 1999:28) reports the heat of combustion, for animal fat, as 39.8 kilogram/joule (kg/j), yet, DeHaan (2008:3) reports subcutaneous fat as having a comparative effective heat of combustion of 32.0 Kg/J. Babrauskas characterized animal fat to possess an auto-ignition temperature of approximately 350 °C in solid state versus 250°C in a vaporous state (DeHaan 2008:3). Similarly, Gee performed a series of experiments that suggested that melted human body fat will burn when it reaches a temperature of approximately 250°C (Christensen 2002:466).

The strong association between the physical properties of animal and human fat, as they relate to fire interaction, provides the author confidence in using the domestic pig (*Sus scrofa*) as the study's research specimen. Animals have commonly been used as substitutes for human cadavers to avoid the vast number of ethical and community issues associated with the use of human cadavers as experimental subjects (de Gruchy and Rogers 2002). Pigs especially have also been favoured as adequate comparative models to their human counterpart because they possess similar weight ranges, percentages of fat content, and body hair texture (DeHaan and Nurbakhsh 2001:1076; Weitzel 2005:1).

2.2.2. Bone as a Rigid and Porous Wick

Bone represents an amalgamation of organic ingredients fused in an inorganic medium. It is comprised of collagen and protein, which provides its tensile strength and mineral hydroxyapatite crystals to supply its compressive strength (Herrmann and Bennett 1999:461, Symes et al. 2008:23). The resilient and complex nature of bone makes it the most suitable candidate as a rigid and porous wick to sustain the flames of subcutaneous fat (DeHaan et al. 1999:28). When used as a wick to sustain flames in turbulent fires, bone can create average temperatures in the order of 800°C (DeHaan 2008:9). However, an interesting study by Christensen (2002:469) revealed that osteoporotic bones were more susceptible to being thermally compromised than healthy bone because of their weakened composition.

2.3. Thermal Injury and Destruction to Human Remains:

2.3.1. Fire Modification Classification Systems

To gain a comprehensive understanding of the complex and intricate interaction that exists between fire and the human body, human anatomy must also be appreciated. The distribution and various depths of soft tissue are directly associated with the mechanisms, locations, and duration from which bone comes into contact with fire (Symes et al. 2008). Thus, before bone undergoes modification, fire must penetrate the many layers of skin, muscle, and fat that protect it. When addressing the effects of fire on the human body, Clarke suggested obvious considerations be given to the temperature, atmospheric concentration, the duration of the contact, and the anatomical area of the body exposed to the flame (Holden et al. 1995:30). DeHaan (2008:8) provided a similar, but more in-depth, account of variables that contribute to the effects of fire exposure on human remains (Table 2.2).

Table 2.2 Variables that contribute to the effects of fire exposure on human remains (DeHaan 2008:8).

(1) Size of the fire
a) Single item burning
b) Multiple items burning
c) Full-room involvement (flashover)
d) Sustained post-flashover burning
(2) Exposure of the body
a) On non-combustible floor for duration of fire
b) On top of burning item(s)
c) On combustible floor that collapses during fire
d) In suspension on a metal 'framework' (ie. car seat)
e) Exposed to fire on all sides (commercial cremations)
(3) Duration of exposure
a) Antemortem
b) Postmortem
(4) Conditions of the bone
a) Fresh or green
b) Dried

Symes et al. (2008:24-25) identify two complimentary systems used for categorizing the degrees of fire modification that cause skeletal trauma. The first system, created by Eckert (1988), also referenced in Mayne Correia (1997), evaluates thermal modification based on the survivorship of flesh and bone. The survivorship stages are: (1) charring of the body with internal organs remaining intact, (2) partial cremation with some soft tissue still present, (3) incomplete cremation with only bone fragments still remaining, and (4) complete cremation leaving only ashes behind. Crow and Glassman (1996) created the second most commonly utilized system which evaluates the destruction of burning on the human body. Their system, known as the Crow Glassman Scale (CGS), classifies thermal destruction to the human body using five levels. Each level is defined by an increase in the percentage, depth of burn, and extent of the thermal damage (Glassman and Crow 1996:152-153). The levels are as follows: (CGS #1) recognizable for identification, the blistering of skin, and singeing of body hair, (CGS#2) possibly recognizable- charring on delicate body parts such as hands, feet, ears, and genitals, (CGS#3) non-recognizable- destruction to the head and disarticulation or missing portions of arms and legs, (CGS#4) extensive burn destruction- skull is absent, missing, or fragmented, and portions of extremities may still be articulated to the body, and (CGS#5) minimal tissue or bone fragments remain.

Though both thermal modification systems are complimentary to one another, the CGS provides a more detailed description of the expected thermal alterations to the human body and the specific bodily regions affected. Furthermore, the CGS will be the thermal modification system used to help evaluated and describe any thermal alterations that result in this descriptive study.

2.3.2. Natural Burn Pattern Signatures

Once initial injuries have been classified, based on the percentage of thermal damage, depth of burn, and extent of thermal damage, further examination is still necessary to evaluate and identify any thermal skeletal patterns present on the hard tissues. Although the circumstances surrounding any fire related human fatality are inconsistent from one case to another, the patterns of thermal destruction they create remain theoretically constant. This is in part due to the protective nature of skin, muscles, and fat that shields the bone. Studies by Pope and Smith (2004) and Symes et al. (2008) have shown that different skeletal elements will experience the thermal destructive process in varying degrees and sequences due to the tissue thickness in any particular location on the human body.

In order to assess heat related skeletal trauma, one must understand the differential thickness and anatomical distribution of soft tissues in conjunction with normal burn pattern signatures. Symes et al. (2008: 30-50) reports that natural burn pattern signatures are the result of three major processes: (1) body position and tissue shielding in bone, (2) colour change in thermally altered bone, and (3) burned bone fracture biomechanics. Understanding these three processes, which constitute natural burn pattern signatures, are fundamental to forensic interpretation. These three processes allows for burn patterning that deviates from natural burn pattern signatures, to be associated with criminal acts, peri mortem trauma, or unique case specific information.

When a fully fleshed body is not restricted, bound, or in an enclosed space, and it is engulfed in a fire for approximately 10 minutes at temperatures between 670-810 °C, its posture undergoes a transformation into a final position known as the pugilistic posture (Bonhert et al 1998; Symes et al. 2008:29-33). As temperatures continue to rise, the shoulders are forced into adduction, the upper and lower limbs are forced into flexion, and the head is forced backwards. The mechanism controlling this change in posture is the overriding contraction of the strongest muscles and ligaments, as they react to the heating and shrinking associated with the fire process. How bones are degraded or modified is determined by the depth of tissue and how a particular anatomical area postures. Therefore, the pugilistic posture serves as a predictive model that illustrates how anatomical areas with minimal soft tissue protection and increased exposure to fire will have the most heat related skeletal trauma. Furthermore, as a result of the predictable relationship between human anatomy and physiology, all regions of the body possess their own unique primary, secondary, and final destruction (Figures 2.1 and 2.2)

(Symes et al. 2008:29-33).

The pugilistic posture model presented by Symes et al. (2008) will primarily serve as the foundation for understanding heat related skeletal trauma in the current study. Since domestic pig remains will be used in lieu of human remains, the author speculates that the burn patterns that are produced in the fresh stage of decomposition will represent the standard burn pattern signatures that would exist for a pig model. Though the pig model is governed by the physiology and anatomy of the domestic pig, it is still expected to produce comparative burn patterns as seen in the pugilistic posture in humans.

The pugilistic posture model is also of interest to the current study because of its predictive nature in determining normal burn pattern signatures. This model; however, is dependent on human remains being in fresh state of decomposition and it may only occur when an individual is not confined, or bound into, a specific position (Symes et al. 2008). The author proposes that it is unlikely for the pugilistic posture to account for, or predict, burn pattern signatures that relate to intermediate and final stages of decomposition because the posture heavily relies heavily upon limb flexion. According to Symes et al. (2008:40) limb flexion "...is a product of the lever forces exerted by muscle fibers on joints and cannot occur without a fulcrum." Conversely, processes of decomposition, such as putrefaction and autolysis, compromise muscle composition and strength, both of which play relevant roles in creating lever forces. Therefore, this further fuels the current objectives of this study, in seeking to evaluate if brush fires were capable of creating unique heat related skeletal trauma at specific stages of decomposition.

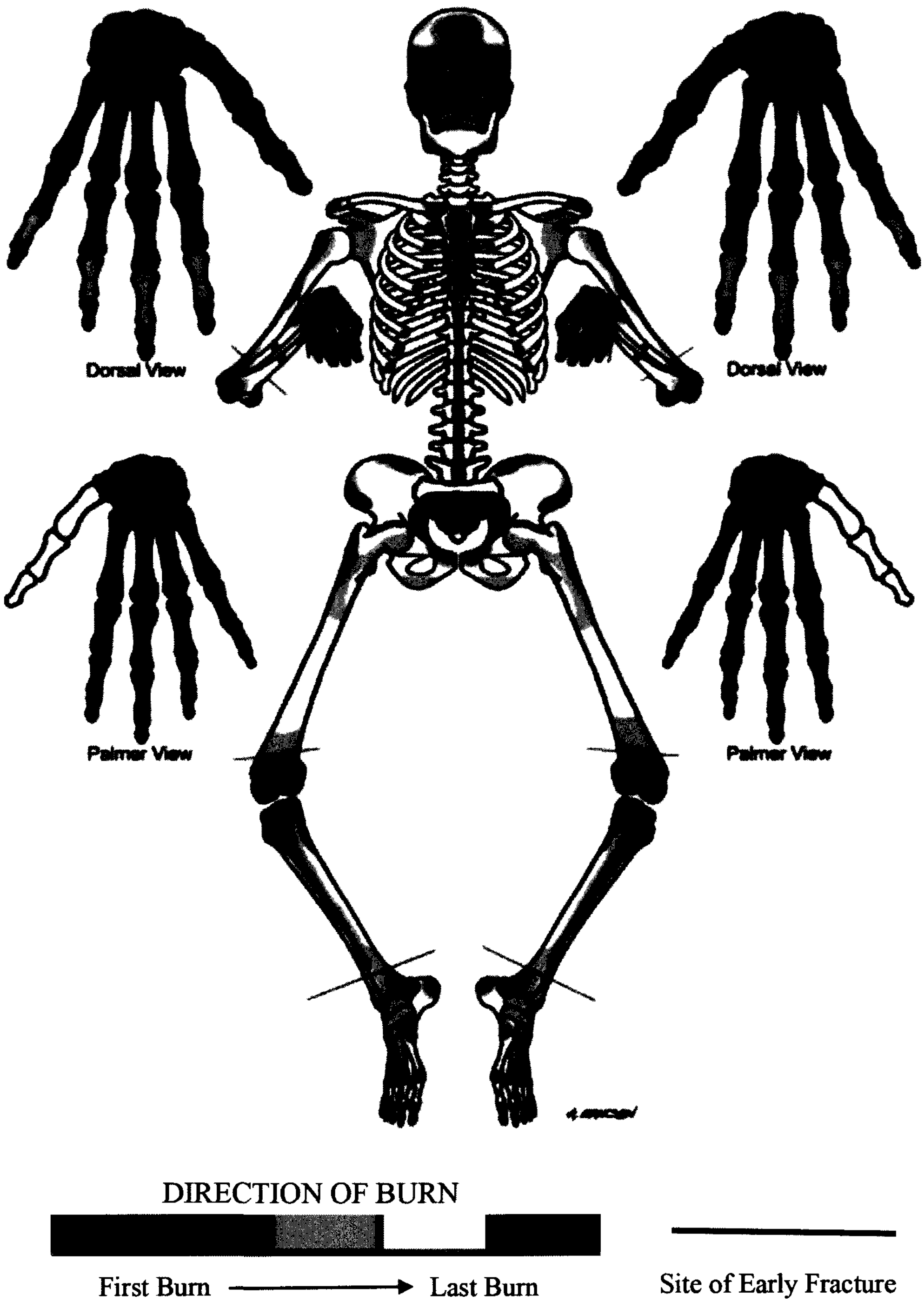

Figure 2.1 Anterior view of the human skeleton depicting the burn signatures of primary, secondary, and final areas of thermal destruction (Symes et al. 2008:32).

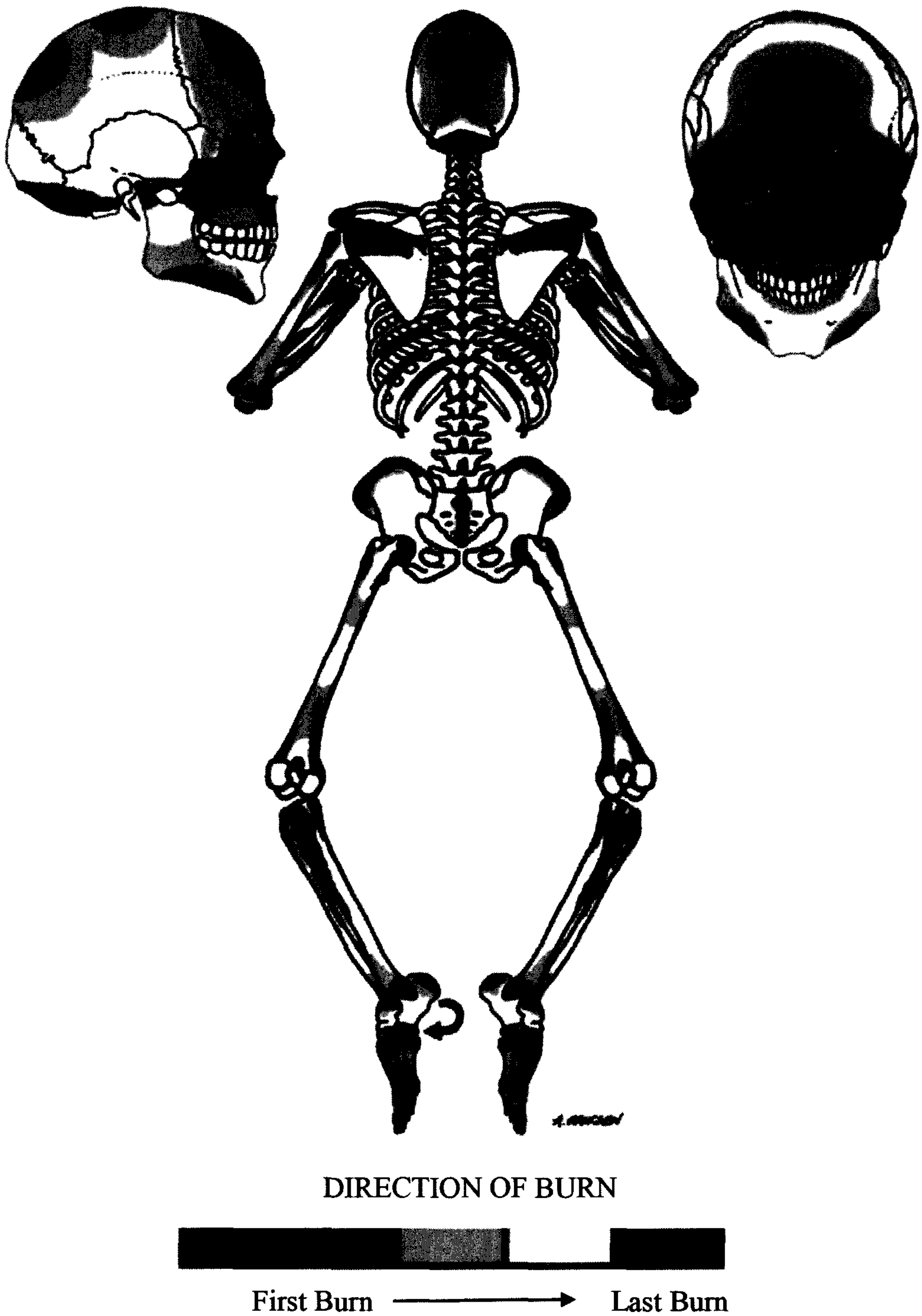

Figure 2.2 Posterior view of the human skeleton depicting the burn signatures of primary, secondary, and final areas of thermal destruction (Symes et al. 2008: 33).

2.4. Heat-induced Transformations in Bone

2.4.1. General Heat-induced Trends

As layers of tissue and under laying viscera are thermally degraded, heat-induced transformations are seen in bone. These transformations are observed as a series of structural and colour changes which reflect the degree of chemical modification to the composition of bone. Researchers, such as Bonucci and Graziani (1975), Mayne Correia (1997), Thompson (2004:s204), and Thompson (2005:1), have studied these stages as they occur in bone during the process of cremation. These stages have been identified as: (1) dehydration, (2) decomposition, (3) inversion, and (4) fusion. Stage 1, dehydration, refers to the leaching of moisture and water because hydroxyl bonds are broken. Stage 2, decomposition, is the removal of organic components by means of pyrolysis. Stage 3, inversion, represents the loss of carbonates and the transformation of hydroxyapatite crystal structures to beta tricalcium phosphate. Lastly, Stage 4, fusion, is the melting and amalgamation of the crystal matrix (Devlin and Herrmann 2008:111, Thompson 2005:1).

Many heat-induced changes that are observed in bone, such as fracturing or changes in colour and mechanical strength may be defined by one of the four stages of heat transformation (Table 2.3). For each specific stage of transformation, there also exists a temperature range at which modifications of chemical composition are expected. These temperature ranges were initially reported by Mayne Correia (1997) and then later revised by Thompson (Thompson 2004:s204). It is important to have a general understanding of heat-induced changes in bone because, although it does not explain every significant change within the skeletal material, it certainly lays the foundation for taphonomic interpretation of macroscopic changes in thermally altered remains (Thompson 2004:s203, Thompson and Chudek 2007:99). Awareness of heat-induced transformations in bone is of importance to the current study because evidence of colour and structural changes in bone can then be confidently associated and described with respect to referenced temperature ranges and stages of heat-induced transformation.

Table 2.3 The four stages of heat-induced chemical transformations in bone (Thompson 2004: s204).

Stages of Transformation	**Evidence**	**Mayne Correia Temperature Range (°C)**	**Thompson Revised Temperature Range (°C)**
Dehydration	Fracture patterns; weight loss	100-600	100-600
Decomposition	Colour change; weight loss; reduction in mechanical strength; changes in porosity	500-600	300-800
Inversion	Increase in crystal size	700-1100	500-1100
Fusion	Increase in mechanical strength; reduction in dimensions; increase in crystal size; changes in porosity	1000+	700+

2.4.2. Interpretation of Colour Change in Thermally Altered Bone

2.4.2.1. Colour Banding

As fire proceeds to consume the human body, it leaves behind a trail of colour bands on the surface of bones. This pattern, also known as colour banding, is a result of heated muscle and tissue fibers as they shrink and recede up the surface of the bones (Symes et al. 2008:35). Once the soft tissues are incinerated, fire begins to penetrate the cortical layer of the bone before later compromising its internal trabecular matrix. This typically results in a charred center coated by an outer layer of calcined bone. It is not until the charred remnants of flesh are removed that the permanent bands of colour may be clearly observed on the surface of the bones. This series of colour bands serves two purposes for the forensic investigator: (1) a reminder of thermal exposure and, (2) a representation of the evolution of the fire as it proceeded to modify a bone's chemical composition (Pope and Smith 2004:3).

Symes et al. (1996) have characterized four unique bands of colour to represent the changes in chemical composition that a bone undergoes due to thermal exposure (as cited in Symes et al. 2008:36). The colour bands are identified as: (1) calcinated bone, (2) charred bone, (3) border, and (4) heat line (Figure 2.3). Calcinated bone is a brittle, ash-like matrix of bone salts that is dehydrated and leached of its organic components. Charred bone is shades of black and brown due to the carbonization of its collagen matrix. The border is an off-white area that is indirectly in contact with thermal heat and smoke and its size varies because of the dehydrating soft tissue which protects it. The border is also harder to identify the longer it is exposed to taphonomic elements. Lastly, the heat line is a fine line between thermally altered and normal bone (Symes et al. 2008:37).

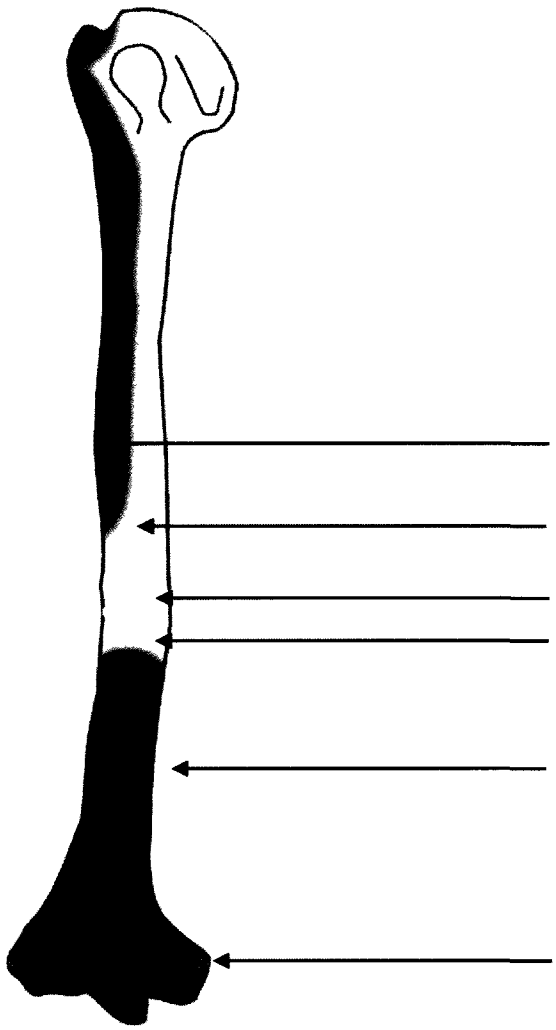

Figure 2.3 Illustrates four colour bands on heat-induced bone: the heat line, border, charred bone and calcinated bone. The heat line is a fine line between thermally altered and natural bone (Whittaker 2011).

In the majority of forensic settings, bones are typically burned while still within soft tissues. Thus, it is important to recognize that burning is never uniform at any particular location on a body due to tissue shielding (Symes et al. 2008:36). However, if tracked appropriately, colour banding can be used to evaluate the progression of bone destruction and distinguish normal from thermally altered bone. It is for this reason that Symes et al.

(2008:35) disagree with previous reports from Mayne Correia (1997:276-277) which state that a single bone is of no help in inferring the dynamics of a fire fatality.

It is the evidentiary value of colour banding that makes it an important tool in the current study. If colour banding can be used to evaluate the progression of bone destruction and distinguish normal from thermally altered bone, then colour banding will play a supporting role in determining burn pattern signatures that result for each stage of decomposition. More specifically, colour banding on the surface of the skeletal remains will help provide clues as to the primary and secondary thermal alterations, based on the degree of charring and calcination present. Areas of calcination represent primary thermal alterations because of prolonged heat exposure and areas of charring represent secondary thermal alterations because charring is a lesser degree of chemical modification to bone (Bonucci and Graziani 1975; Munro et al. 2007; Shipman et al. 1984).

2.4.2.2. Colour Chronology and Its Relationship with Temperature

Many decades of thermal research have been devoted to the identification of colour and texture changes in thermally altered remains (Bonucci and Graziani 1975; Brain 1993; Devlin and Herrmann 2008; Dunlop 1978; Hanson and Cain 2007; Holden et al. 1995; Munro et al. 2007; Nicholson 1993; Shahack-Gross et al. 1997; Shipman et al. 1984; Stiner et al. 1995; Whyte 2001). These studies were primarily archaeologically or forensically-based experiments and their thermal inquiries were made with the use of various animal and human remains. These experiments evaluated the effects of temperature on colour and texture by use of x-ray diffractions, transmitted light and scanning electron microscopy, histological analysis, chemical analysis, infra-red spectroscopy, macroscopic photography, and a Munsell colour chart. Collectively, these studies have shown that the sequence of thermal discolouration has evolved through a general colour continuum. The colour continuum transitions through the following colours: (1) pale yellow in its natural state, (2) shades of brown and black as organic pyrolysis and carbonization occur, and (3) shades of bluish white and grey as pyrolysis is completed and calcination has occurred (Bonucci and Graziani 1975; Buikstra and Swegle 1989 as cited in Christensen 2002:469; Shipman et al. 1984:313).

Brain (1993) has reported that the colour spectrum is a good indicator of temperature and duration of heating. This is illustrated through the work of previous researchers, such as Bonucci and Graziani (1975), Shipman et al. (1984), and McCrutcheon (1992). Bonucci and Graziani (1975:53) stated that yellow bone progresses to brownish colours with exposure to approximately 200-300°C, black at approximately 300-350°C, greyish at approximately 550-600°C, and white for any temperatures in excess of 650°C. While Bonucci and Graziani (1979) used four broad temperature ranges to describe their colour continuum, Shipman et al (1984) dissected the colour continuum into smaller temperature ranges with a wider range of colours observed.

Shipman et al. (1984:313) standardized the description for surface colour changes related to experimentally heat-induced bone into five distinct colours and temperature ranges. This was accomplished with the use of a Munsell colour chart, a light source and a scanning electron microscope. Stage 1 cites colours of pale yellow and very pale brown at temperatures approximately less than 285°C. Stage 2 describes primary colours of pink and black and secondary colours of very dark greyish brown and brown between temperatures of less than approximately 285-525°C. Stage 3 illustrates primary colours of neutral blacks with medium blue, some reddish yellow and light grey, and secondary colours of brown and light brownish grey at temperatures up to 645°C. Stage 4 depicts colours of neutral white and light blue grey colours at temperatures up to 940°C. Stage 5 describes colours of neutral white and medium grey colours for temperatures in excess of 940°C.

McCutcheon (1992), like Bonucci and Graziani (1979), opted for the use of a broader temperature range to describe their colour observations. Their surface colour and microscopic evaluations created a three-stage system for estimating exposure temperature ranges. McCutcheon (1992) reported pale brown to black in thermally altered bone heated to approximately 340°C, light brownish grey in thermally altered bone heated to approximately 600°C, and predominately white in thermally altered bone heated in excess of 650°C.

Experiments, such as Bonucci and Graziani (1975), McCutcheon (1992), Shipman et al. (1984) and Stiner et al. (1995) and Taylor et al. (1995), have shown that specific colours are achieved once a specific temperature range has been attained. Though, if trying to infer temperature from the surface colour of skeletal remains, researchers must give consideration to factors that contribute to the production of surface colour. Consideration must be given to the protection afforded by flesh, the location of the bone in relation to the fire, alterations due to deposition contamination, and staining due to soil moisture content (Bonucci and Graziani 1979; Taylor et al. 1995; Shipman et al. 1984:320 and Walker et al. 2008). These factors will affect the amount of exposure to direct contact with heat and fire.

Although surface morphology experiments have produced abundant and informative results, researchers strongly advise caution with colour and temperature interpretations. Many researchers have noted that mammal and non-mammal bones experienced similar morphological and colour changes with thermal exposure; yet, the temperature ranges at which these modifications happen may vary (Bonucci and Graziani 1975; Nicholson 1993:411; Shipman et al. 1984:313, 320 and Taylor et al. 1995:116). Researchers described colour as an inference that should be used to establish the temperature at which a bone has been thermally treated within a ±50°C range. Shipman et al. (1984:320) also declared the use of colour as evidence of thermal contact as an "essentially imprecise criterion both because of individual differences in the ability to perceive fine colour distinctions and because burned bones may change colour if they are buried." In the current study, the maximum temperatures at which bones were heated are not of immediate interest. Rather it is the variety of colours produced from human remains, in various stages of decomposition, that are exposure to fire and their affinity to similar colours produced from exposure to an outdoor environment. Thus, surface colour will be utilized as a reliable indicator of thermal evidence but not the precise degree to which a bone has been burned (McCutcheon 1992; Shipman et al. 1984:314).

2.4.2.3. The Use of Munsell Nomenclature to Standardize Colour

Munsell Colour Measurements are typically employed by anthropologists to standardize colour interpretation from the surface of skeletal remains (McCutcheon 1992; Munro et al. 2007; Nicholson 1993; Shipman et al. 1984). McCutcheon (1992:353) described colour as a descriptive and useful feature of many burn studies because colour is based on "an implicit *a priori* assumption that when bone is burned, changes in colour can be correlated with temperature." The Munsell system of colour evaluation heavily relies on the eye's perception of colour in the three dimensions of hue, value, and chroma; its interpretation being quite straightforward (Munsell 2000). Hue represents a colour's similarity to red, yellow, green, blue, purple or a combination of these colours. A hue notation is represented by a symbol in the upper right hand corner of an individual soil colour chart. When a colour is assigned the symbol N it is perceived as a neutral that lacks a hue. Value represents a colour's degree of lightness. As the value notation increases vertically up an individual soil colour chart, the associated colour increases in lightness. Chroma represents a colour's richness and its notation increases horizontally from left to right (Munsell 2000 and Devlin and Hermannn 2008: 112). In any colour measurement, hue, value and chroma are always found in the same sequence of order as stated. An example Munsell colour reading is: 7.5YR 3/2, where 7.5YR represents the hue, 3 represents the value and 2 represents the chroma of this particular measurement.

Although the Munsell colour system is frequently utilized to standardize colour readings from the surface of skeletal remains, it is still debated as a slightly subjective technique. Devlin and Herrmann (2008:112) apply caution to the use of this technique because its manual use warrants the aid of a light source. Light could be supplied in a natural or artificial form and if the correct source is not used, it will affect colour interpretation and, thus, produce inter-observer error.

While only eight pig cadavers are used in the current study to evaluate if burn pattern signatures exist for three specific stages of decomposition, the full skeletal inventory, i.e. "X" bones, of each pig is expected to be used to evaluate if colour mimicry is possible between burned and unburned remains. The author also expects that there will be a high degree of mottling from environmental staining and heat related skeletal trauma that will be far too time consuming to manually, precisely and objectively evaluate colour. Therefore, to avoid complication during colour analysis, all colour measurements will be collected using a CR-11 digital colour reader. The CR-11 digital colour reader is a portable and straightforward tristimulus colourimeter which is specifically created to produce its output in Munsell nomenclature. A helpful feature of this portable reader is that it is capable of taking a total of 50 consecutive colours, which can then be transferred as a text file to a printer or computer via connector cables (Konica Minolta 2003). The digital colour reader will be rented from the Maritime Provinces Spatial Analysis Research Center which is located on the Saint Mary`s University campus.

2.5. Implications of Mimicry & Thermally Altered Remains to the Forensic Context

2.5.1. Mimicry at a Macroscopic Level: Burning, Weathering & Fossilization

When skeletal remains are exposed to heat, they undergo a series of chemical transformations in the form of colour and structural changes. As the duration of exposure to heat therapy increases, bone colour dynamically changes to reflect the chemical reductions to its mechanical composition. Thus, bone colour changes from its natural state of yellow into shades of brown and black as bone dehydrates and carbonization takes place. Calcination shortly follows, causing the structure of bone to become increasingly fragile and brittle and its colour to transition from shades of grey blue to white (Oakley 1955; Stiner et al. 1995).

While gross macroscopic surface characteristics, such as colour, warping, cracking and exfoliation, have been employed to describe burned remains, they are also common features of unburned bone. Processes of diagenesis, such as weathering and fossilization, have been known to cause modifications to the surface texture of bone. Similarly, post-depositional staining from soil and sediment has also been known to mimic colour changes associated with thermal modifications (Hanson and Cain 2008:1903; Nicholson 1993, White 1992). It is for these reasons that microscopic and macroscopic surface examinations may misidentify the processes that alter the surface texture and colour of bone. Furthermore, it is due to this taphonomic misinterpretation that the current study sought to investigate the extent of comparative colour and mimicry between burned and unburned remains.

The initial criterion used to evaluate if a bone has been exposed to thermal heat typically involves the evaluation of gross macroscopic surface characteristics. Commonly inspected features include colour, cracking, warping, and the degree of calcinations; however, it is the black or ash-like staining on the surface of bone that is considered primary evidence of burning (Bonucci and Graziani 1975; Brain 1993; Devlin and Herrmann 2008; Dunlop 1978; Hanson and Cain 2007; Holden et al. 1995; Munro et al. 2007; Nicholson 1993; Shahack-Gross et al. 1997; Shipman et al. 1984; Stiner et al. 1995; Whyte 2001). Although black or ash-like staining is used to identify burned remains, these are also characteristics that are occasionally observed in unburned bone (White 1992). More specifically, bones that have been diagenetically modified by processes of weathering or fossilization have been reported to resemble cremains (Hanson and Cain 2007; Sillen and Hoering 1993; Stiner et al. 1995; Taylor et al. 1995). Taylor et al. (1995:116) cites that "the incidence of thermally altered remains is probably underreported in general archaeological literature and non-calcinated burned specimens are probably most commonly labeled as 'weathered.'" It is due to the similarities produced on the surface of skeletal remains, by means of different taphonomic processes, that macroscopic surface assessments may be misleading (Hanson and Cain 2007).

In cases where it is difficult to distinguish between taphonomic mechanisms that produce similar characteristics on the surface of skeletal remains, a more invasive examination is sometimes necessary. For example, since processes such as weathering and fossilization do not significantly alter the internal matrix of bone, as does thermal exposure, a histological examination could be used as a reliable indicator to confirm the origin of colour staining (Hanson and Cain 2007:1903). Similarly, research by Brain and Sillen (1988) concluded that the Carbon/Nitrogen ratio in fossil bones could be used to distinguish between the black staining due to heat treatment versus black manganese oxides.

2.5.2. The Impact of Thermal Research on the Forensic Context

One of the major goals of thermal skeletal trauma research is to provide insight into understanding the heat-induced modifications to the micro and macrostructure of bone that affects the identification process and the potential for recovering evidence of criminal activity (Thompson 2005; Thompson and Chudek 2007; Symes et al. 2008). Stewart (1979) highlighted many of the immediate benefits gained through thermal research. He stated that thermal research would provide insight that would strengthen: (1) evaluating whether peri mortem or post mortem traumas could be determined post cremation, (2) determining if a body's state of decomposition and position at time of cremation can be established, (3) understanding the nature of fire's consumption of hard tissue, and (4) whether morphological and metric evaluations could be performed on thermally altered remains (Stewart 1979; Symes et al. 2008:16). Undeniably, colour typing of the surface of bone plays a role in the impact of thermal research on the forensic context. Although it does not have immediate implications for morphological or metric techniques in forensic anthropology, it is heavily relied upon for its impact on taphonomic interpretation. Researchers have cited that colour typing creates an uncertainty as to whether skeletal staining is due to the depositional environment or from being exposed to fire (Thompson 2005:4). Yet, regardless of this uncertainty and criticism, colour typing still remains one of the most resourceful methods for the identification of burned bone (Munro et al. 2007:94). It is for this reason, and those outlined in the current study's objectives, that colour typing research will be conducted in order to strengthen its impact as a strong indicator of thermal exposure.

2.6. Quantitative Methods Used to Define Stages of Decomposition

Although the focus of the current study is concentrated on learning more about fire's interaction with human remains, mention must be given to Accumulated Degree Days (ADD), its impact on decomposition studies and how it will aid in the development of the current methodology. An Accumulated Degree Day is defined as a unit of heat energy that is accessible to drive biological processes and reactions. Examples of biological mechanisms that are driven by heat energy include: enzyme interactions, bacterial development and insect larvae growth (Megyesi et al. 2005:4). A daily value of ADD is equivalent to the daily average temperature over a given 24-hour period and an ADD value for a designated period of time is calculated by the summation of their daily average temperatures. An example of this is illustrated through the accumulation of 100 ADD in two different environments. In a warm environment, which averages 25°C daily, it will take approximately four days to achieve a value of 100 ADD. In a much colder environment, which averages temperatures of 10°C, it will take approximately ten days to achieve the same value of 100 ADD. By utilizing ADD, the relationship between temperature (°C) and time (days) is standardized thus allowing temperature to be used as an independent variable.

Prior to the use of ADD, the majority of decomposition studies were local and season specific. Comparisons between different geographic data sets could not be performed nor could the value of each study be shared equally among the forensic community (Adlam and Simmons 2007:1013). However, since the adoption of ADD, a new avenue has been created to allow such cross comparisons. This has produced immense benefits for decomposition studies and taphonomic research (Adlam and Simmons 2007:1011). A study by Megyesi et al. (2005) has shown that the process of decomposition can predict the ADD interval with a 95% confidence and that decomposition rates are best modeled as dependent on accumulated temperature and not just time. By utilizing Accumulated Degree Days, the study found that over 80% of the observed variation of human decomposition, from 68 human cases, could be accounted for by the summation of time elapsed since death and temperature (Megyesi et al. 2005).

The Megyesi et al. (2005) study is of importance to the current study because it revolutionized the way decomposition can be described and measured. Megyesi et al. (2005) revised the classic descriptive table of Galloway et al. (1989) and introduced a qualitative and quantitative classification model. This model provided descriptions, ranking and a score-point system to evaluate key characteristics of each of the four major stages of decomposition. Decomposition of the body was also evaluated by dividing the body into three different anatomical areas for evaluation: (1) the head and neck, (2) the trunk, and (3) the limbs (Tables 3.1 to 3.3). The last, and fourth, score given to decomposition is the Total Body Score (TBS). It illustrates the accumulation of decomposition, as it is represented in each of the three anatomical regions of the body (Megyesi et al. 2005).

Table 2.4 Categories and Stages of Decomposition for the Head and Neck (Megyesi et al. 2005:4).

A	**Fresh**
(1pt)	1. Fresh, no discolouration
B	**Early Decomposition**
(2pts)	1. Pink-white appearance with skin slippage and some hair loss
(3pts)	2. Grey to green discolouration: some flesh still relatively fresh
(4pts)	3. Discolouration 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 discolouration 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	**Skeletonization**
(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 2.5 Categories and Stages of Decomposition for the Trunk (Megyesi et al. 2005:4).

A	**Fresh**
(1pt)	1. Fresh, no discolouration
B	**Early Decomposition**
(2pts)	1. Pink-white appearance with skin slippage and marbling present
(3pts)	2. Grey to green discolouration: some flesh still relatively fresh
(4pts)	3. Bloating with green discolouration and purging of decompositional fluids
(5pts)	4. Postbloating following release of the abdominal gases, with discolouration 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 less than one-half that of the area being scored
D	**Skeletonization**
(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 that area being scored
(11pts)	3. Bones largely dry, but retaining some grease
(12pts)	4. Dry bone

Table 2.6 Categories and Stages of Decomposition for the Limbs (Megyesi et al. 2005:5).

A	**Fresh**
(1pt)	1. Fresh, no discolouration
B	**Early Decomposition**
(2pts)	1. Pink-white appearance with skin slippage of hands and/or feet
(3pts)	2. Grey to green discolouration: some flesh still relatively fresh
(4pts)	3. Discolouration and/or brownish shades particularly at edges, drying of fingers, toes and other projecting extremities
(5pts)	4. Brown to black discolouration, 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 less than one-half that of the area being scored
D	**Skeletonization**
(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

If the fresh, advanced and skeletonization stages of decomposition in the current study are evaluated with the assistance of the Megyesi et al. (2005) decomposition model, any findings from the burn pattern signatures can be described with confidence. By utilizing its qualitative descriptions and quantitative scores to identify the daily decomposition of each pig, the author will be able to ensure the correct identification of each stage of decomposition. Thus ensuring that the pigs will be thermally altered at specific stages of decomposition of interest and that the resulting burn patterns can be directly linked back to these decomposition stages.

A second study of interest is by Vass et al. (1992), which measures the release of Volatile Fatty Acids (VFA) into the soil directly beneath a sample of decomposing cadavers. This study also evaluated the effects of ADD on the release of VFAs and concluded that VFAs were no longer found in the soil after 1285 ADD ±110 ADD (Vass et al. 1992). Volatile Fatty Acids are produced from muscles and fats as they are leached out of a decomposing cadaver. Therefore, by the approximate accumulation of 1285 ADD ±110 ADD, human remains should be essentially skeletonized. Megyesi et al. (2005) reported that by approximately 1200 ADD, all 68 evaluated cases had a TBS of greater than 25 points. This indicated that there was bone exposure over most of the body and the remains were skeletonized and, furthermore, these results are within broad agreement of the study by Vass et al. (1992).

The author of the current study believes that the studies by Megyesi et al. (2005) and Vass et al. (1992) serve as prime examples of why the use of ADD is important and relevant to the evaluation of decomposition and the estimation of the PMI. Furthermore, these are also valid reasons why the use of ADD should be applied to the current study. Accumulated Degree Days can aid the current study by creating a suggested timeframe by which skeletonization should occur and, thus, help design an expected timeline for the length of the field component.

Chapter 3: Materials and Method

3.1. Research Site

The research site was a secluded wooded area, which received both sun and shade, within the confines of the Nova Scotia Firefighter School (NSFS) in Waverly, Nova Scotia (Figures 3.1 and 3.2). The use of this site was approved by Mr. John Cunningham, Executive Director of the NSFS. The property was under 24-hour surveillance and the entrance was gated. The perimeter of the property bordered a lake on one side and a wall of trees on the other side. The security feature of this site was sufficient to keep out unauthorized personnel but it allowed scavengers to enter the property at all hours. An area of approximately 15 meters by 15 meters was selected for use by the author and Mr. Wayne Chapdelaine, Fire Director of Metro-Rural Fire Forensics (MRFF) and member of the author's supervisory committee. This area was selected because the vegetative conditions were suitable for brush fires – it included an incomplete tree canopy and a semi-cleared forest floor mixed with granite rock and organic vegetation at various stages of decomposition.

Figure 3.1 View of the research site to illustrate the incomplete vegetation canopy and low vegetative brush.

Figure 3.2 Close-up of the ground cover which includes granite rocks, low vegetation, and organic materials in various stages of decomposition.

3.2. Experimental Specimen

A total number of eight pigs were used in this study; they were supplied by Oulton Meats in Windsor, Nova Scotia. The pigs were harvested at an approximate weight of 50 kg to simulate the body mass of a human cadaver. Once the author, Mr. Wayne Chapdelaine, and a third support personnel arrived at Oulton Meats, the pigs were killed. This ensured that minimal time elapsed between the pigs' time since death and the time they were deposited on the research site. Each pig was tasered and then shot in the head with a bolt-gun by a staff member of Oulton Meats. A total of three juvenile males and five juvenile females were euthanized for this project. Females were distinguished from males based on the presence of their external genitalia. Female pigs possess a prominent papilla that projects from their urogenital opening just ventral to their anus (Morgan and Carter 2008: 575-576).

3.3. Experimental Design of Research

3.3.1. Use of Cages and Deposition of Pigs

Once the eight pigs were completely motionless, they were transported to the NSFS. They were laid in the back of Mr. Chapdelaine's truck on their right side to keep the livor mortis of all eight pigs consistent. It was also important to have all eight pigs laid in the truck on their right side so that consistency of sidedness could be ensured in the field when the pigs were laid under their cages. This would allow for comparisons to be made between similar bones for burn or discolouration pattern analyses. The total time elapsed between time since death and arrival at the NSFS was approximately one hour and 30 minutes.

Once at the NSFS, each pig was laid on its right side and housed within a custom-made lobster cage which was made by Rainbow Net and Rigging in Dartmouth, Nova Scotia. The cages were constructed as a stable structure with a top and four sides. The cage dimensions were 5 feet by 2.5 feet by 1.5 feet. The cage design allowed for easy access to each pig to simulate the brush fire without disturbing their position or posture while they decomposed. The mesh for the cages consisted of galvanized metal with a plastic coating and the selected weave was 1.5 inches by 1.5 inches. The mesh size was selected to prevent large scavengers such as coyotes, bears, raccoons, and birds from accessing or removing portions of the pigs, yet, still allowing the pig carcasses to be exposed to the micro-environmental conditions, insect activity, and small rodents. The cages were secured to the ground with the use of tent pins in all four corners and a Come-Along web strap across the top of the cage, from side to side. A Come-Along tool is a hand operated ratchet lever winch that is used to tighten or loosen a strap or rope.

As stated previously, one of the goals of this study was to evaluate the burn and discolouration patterns that manifest on the surface of bones. In order to achieve this goal, the eight pigs were placed into four groups of two pigs for evaluation. Each group of two pigs was designated an ideal stage of decomposition that must be reached before they would be exposed to a simulated brush fire. The four-paired groups were as followed: (1) control, non-burned pigs, (2) fresh, burned pigs, (3) advanced decomposition, burned pigs, and (4) skeletonization, burned pigs. Each cage was given its own unique identification tag which stated the following information: (1) a caution statement in bold "PLEASE DO NOT TOUCH!!!," (2) an assigned pig number, (3) the paired grouping type, (4) the author's name and contact number, and (5) the logos for Saint Mary's University and MRFF (Figure 3.3).

Figure 3.3 An example of an identification tag which was placed on the front of each cage.

Each of the four-paired groups of pigs were laid out approximately 1 to 3 meters away from each other, while the two pigs in a single paired group were laid out approximately 1 to 1.5 meters apart (Figure 3.4 to 3.6). The variation of distance between each paired group was determined by boulders, trees, brush, and uneven terrain that would interfere with the placement of the cages used to protect the pig cadavers. The overall spatial arrangement of the pig cadavers was employed for two reasons. Firstly, the pigs were in close enough proximity so that they could share the same micro-environment and secondly, when one paired group of pigs was exposed to a simulated brush fire, the decomposition processes of the other three groups were not disturbed.

Figure 3.4 Illustration of the placement and proximity of pigs #1 through to #4 to each other. Pigs #1 and #2 were labelled "burn treatment: control" (black arrows) and pigs #3 and #4 were labelled "burn treatment: fresh" (yellow arrows). The location of pigs #5 and #6 (red arrow) and pigs #7 and #8 (blue arrow) are also shown.

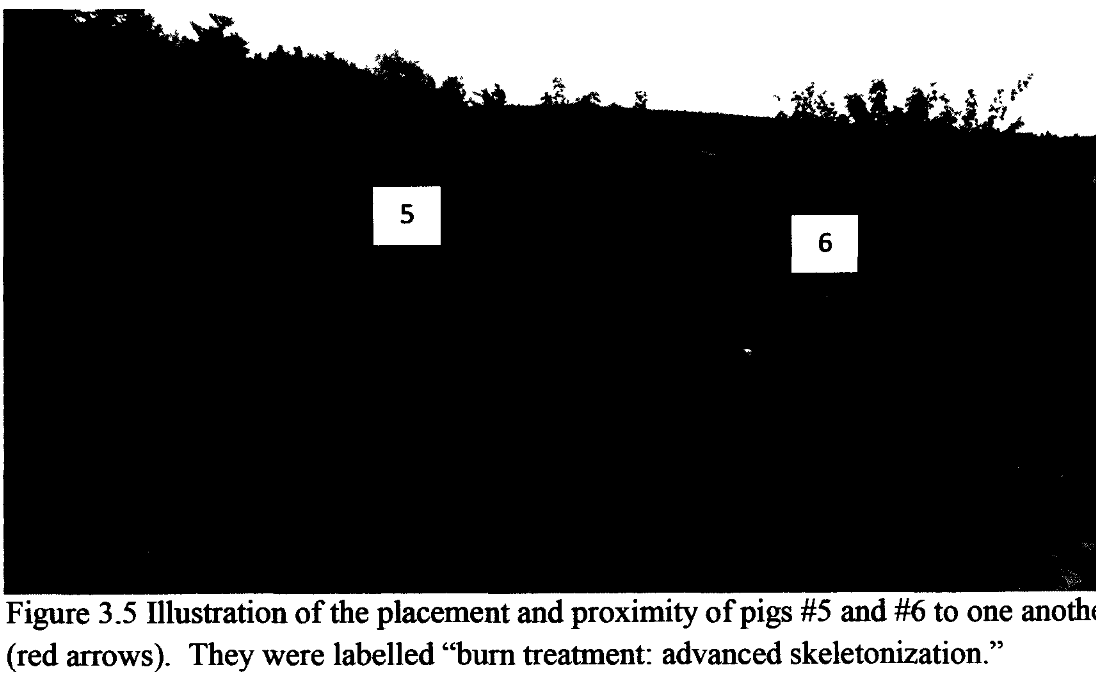

Figure 3.5 Illustration of the placement and proximity of pigs #5 and #6 to one another (red arrows). They were labelled "burn treatment: advanced skeletonization."

Figure 3.6 Illustration of the placement and proximity of pigs #7 and #8 to one another (blue arrows). They were labelled "burn treatment: skeletonization."

3.3.2 Daily Data Collection

The decomposition patterns of all eight pigs were recorded daily from 2 June 2009 to 25 August 2009, for a total of 84 days (Appendix A). The site was visited at approximately 9:00 am on a daily basis to keep data collection and photo documentation consistent. However, field data was not collected on 23 August 2009, due to inclement weather caused by Hurricane Bill. On a daily basis, the Megyesi et al. (2005) methodology was used to evaluated and score decomposition in the head and neck, trunk and limb regions for all eight pigs. Photographs were also taken as supplementary illustrations to document the process of decomposition. These photographic images included aspects of the anterior, superior, posterior, ventral, left lateral surface of each pig, and any unique features or the presence of insects. Lastly, Environment Canada was consulted on a daily basis to collect weather data such as: the minimum and maximum temperature, relative humidity, and total precipitation.

3.3.3. How Specific Stages of Decomposition Were Identified

All four-paired groups of pigs were laid out and allowed to start their decomposition processes naturally. They were secured and protected under their custom-made cages throughout the entire decomposition process with the exception of when they were exposed to the simulated brush fires and the cages were then removed. To qualitatively and quantitatively determine the decomposition stages of the pigs, prior to their burn treatment, they were evaluated using the methodology of Megyesi et al. (2005). In total, each pig received four daily scores to describe its decomposition status: (1) the head and neck, (2) the trunk, (3) the limbs, and (4) the total body. Both precision and accuracy were ensured by using both qualitative observations and quantitative scores to identify the daily decomposition status of each pig. This made certain that the appropriate stages of decomposition were achieved by each paired grouping prior to being exposed to the simulated brush fire treatments. Similarly, using the methodology of Megyesi et al. (2005) guaranteed that if any significant burn patterns signatures were documented, they could be associated with specific stages of decomposition and used to make taphonomic predictions and interpretations.

3.3.4. Assessment of Decomposition Stages & Simulated Brush Fire Treatments

3.3.4.1. Assessment of Decomposition in "Fresh" Pig Pair

The control pair group, pigs #1 and #2, was allowed to proceed from fresh to skeletonization in an undisturbed manner for the entire field component of this study.

The first simulated brush fire treatments were conducted on 2 June 2009 with the help of MRFF personnel. Pigs #3 and #4 were labeled "burn treatment: fresh" and they were the first pig pair to be exposed to the simulated brush fires. Pigs #3 and #4 both had a total body score of 3 points, with the following breakdown: head and neck region (1 point), trunk region (1 point), limb regions (1 point). According to the methodology of Megyesi et al. (2005:4-5), a score of 1 point in each of the three regions refers to a "fresh state with no discolouration" (Figures 3.7 and 3.8). This ensured that both pigs met the criteria to be recognized as "fresh" bodies exposed to thermal treatment.

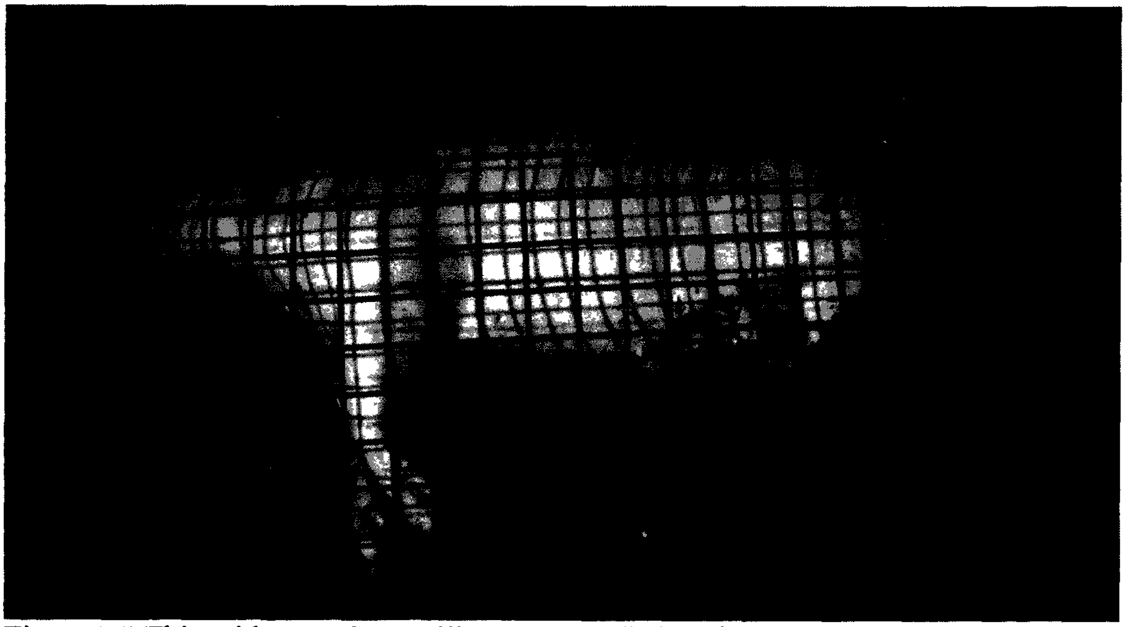

Figure 3.7 This mid-range image illustrates pig #3 in a fresh state, under its cage, prior to the burn treatment (left lateral view).

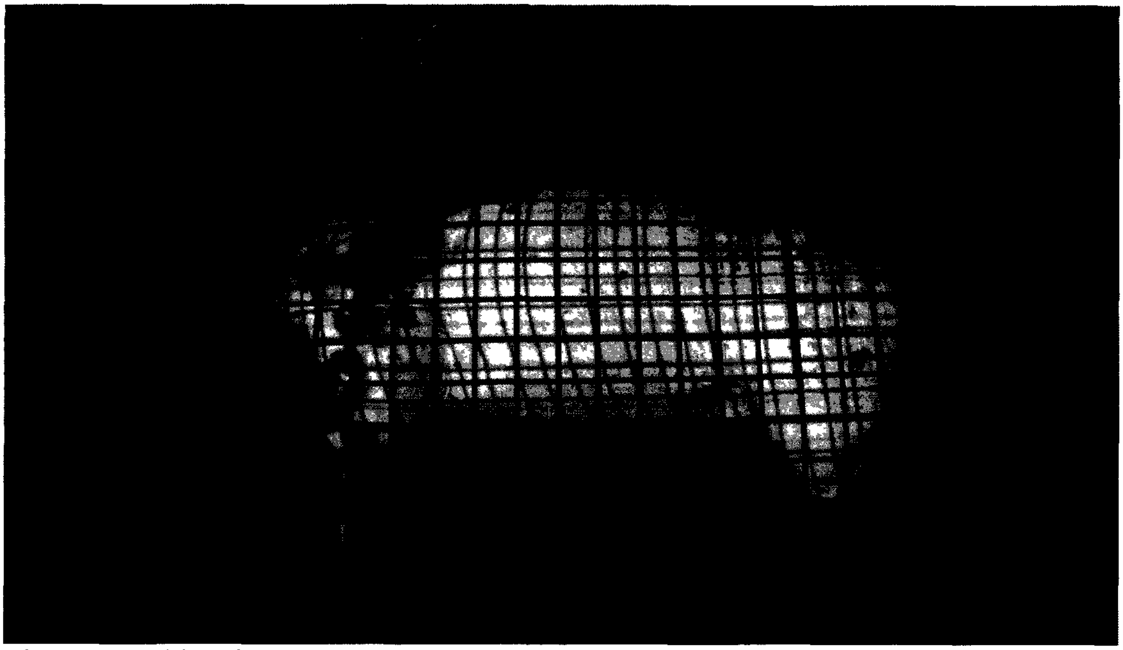

Figure 3.8 This mid-range image illustrates pig #4 in a fresh state, under its cage, prior to the burn treatment (left lateral view).

3.3.4.2. Burn Treatment to "Fresh" pig pair

Once the cages from pigs #3 and #4 were removed, the pigs were exposed to the simulated brush fire treatments. The burn protocol used by MRFF personnel involved utilizing a Tiger Torch to create a line of fire in the vegetative brush ventral to the trunk of pig #4. A Tiger Torch is a portable, heavy-duty heating tool that is powered by a propane tank. The use of a Tiger Torch allowed the fire to sustain itself on the fuel provided from the vegetative brush until the flames came into contact with the flesh of the pig. The same protocol was applied to the remains of pig #3. Each fire lasted approximately 20 minutes before it self-extinguished. For the duration of each burn treatment, the fire proceeded through the low vegetation and caused thermal damages to each pig from their ventral to dorsal surface (Figures 3.9 to 3.16). Both fires were not powerful enough to proceed over the left lateral surface of the pigs and, as a result, they only travelled around the perimeter of each pig. Once fire personnel confirmed that the fires were extinguished and all safety precautions were taken to secure the area, the cages were re-secured over the burned remains of pigs #3 and #4.

Figure 3.9 This overall image illustrates Wayne Chapdelaine, of MRFF, setting fire to the low vegetative brush inferior to the ventral surface of pig #4 with the use of a Tiger Torch (yellow circle).

Figure 3.10 This overall image shows the brush fire as it proceeds through the vegetative brush and interacts with the epidermis on the ventral surface of pig #4.

Figure 3.11 This mid-range image shows the thermal damage which occurred on the ventral surface of pig #4 as the fire proceeded around to the dorsal surface.

Figure 3.12 This mid-range image illustrates the fire as it flamed and smouldered around to the dorsal surface of pig #4.

Figure 3.13 This overall image shows the brush fire as it was ignited and documented by MRFF. The fire proceeded through the vegetative brush and interacted with the ventral surface of pig # 3.

Figure 3.14 This mid-range image depicts the thermal damage which occurred on the anterior-ventral surface of pig #3 as the fire proceeded around to the dorsal surface.

Figure 3.15 This mid-range image illustrates the thermal damage which occurred on the posterior-ventral surface of pig #3 as the fire proceeded around to the dorsal surface.


Figure 3.16 This mid-range image illustrates the fire as it flamed and smouldered around the dorsal surface of pig #3.

3.3.4.3. Assessment of Decomposition in "Advanced Decomposition" pig pair & "Skeletonization" pig pair

On 9 July 2009, the two remaining burn pig pairs, advanced decomposition and skeletonization, received their burn treatments. Originally, pigs #5 and #6 had been labelled as "burn treatment: advanced decomposition" and pigs #7 and #8 had been labelled as "burn treatment: skeletonization". However, by 9 July 2009, the reverse characteristics were observed within each paired pig grouping. Pigs #5 and #6 exhibited quantitative scores and qualitative features of skeletonization and pigs #7 and #8 displayed quantitative scores and qualitative features characteristic of advanced decomposition. From this date forward, the two pig pairs were renamed and treated accordingly.

3.3.4.4. Assessment of Decomposition in "Skeletonization" Pig Pair

A total body score of 27 to 35 points was indicative of skeletonization according to the methodology by Megyesi et al. (2005). Pig #5 had a total body score of 27 points with the following tabulated score: head and neck region (10 points), trunk region (9 points), limb regions (8 points). This score was qualitatively defined by the following features in the methodology by Megyesi et al. (2005): bone exposure of more than half of the head and neck region with greasy substances and decomposed tissue; bones with decomposed tissue, sometimes with body fluids and grease still present in the trunk region; and bone exposure over one-half of the limb region, with some decomposed tissue and body fluids remaining (Figures 3.17 to 3.22).

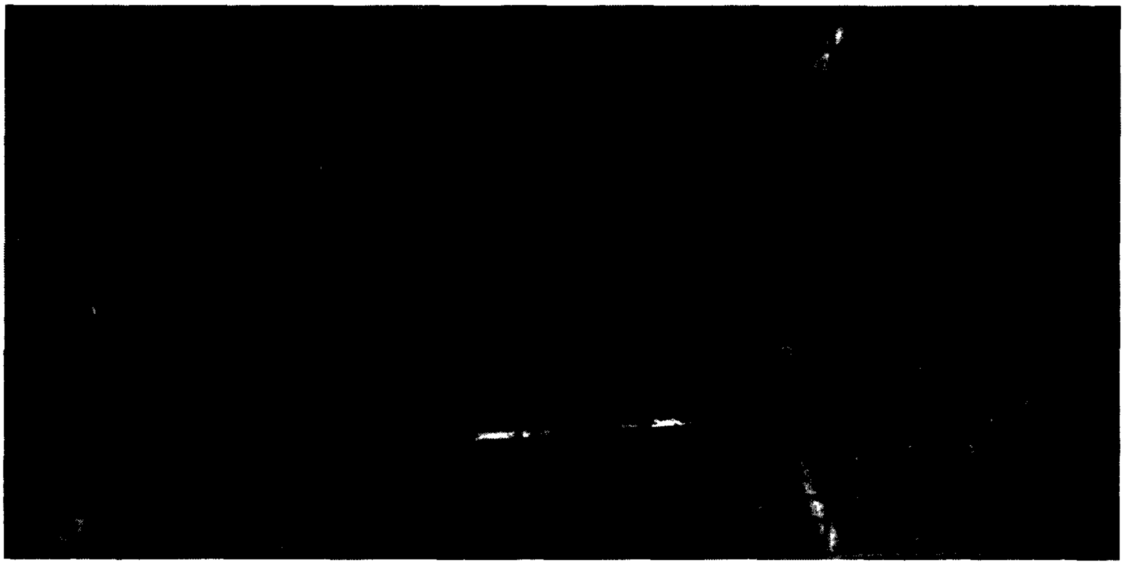

Figure 3.17 An overall image of pig #5 prior to its burn treatment (left lateral-ventral view).

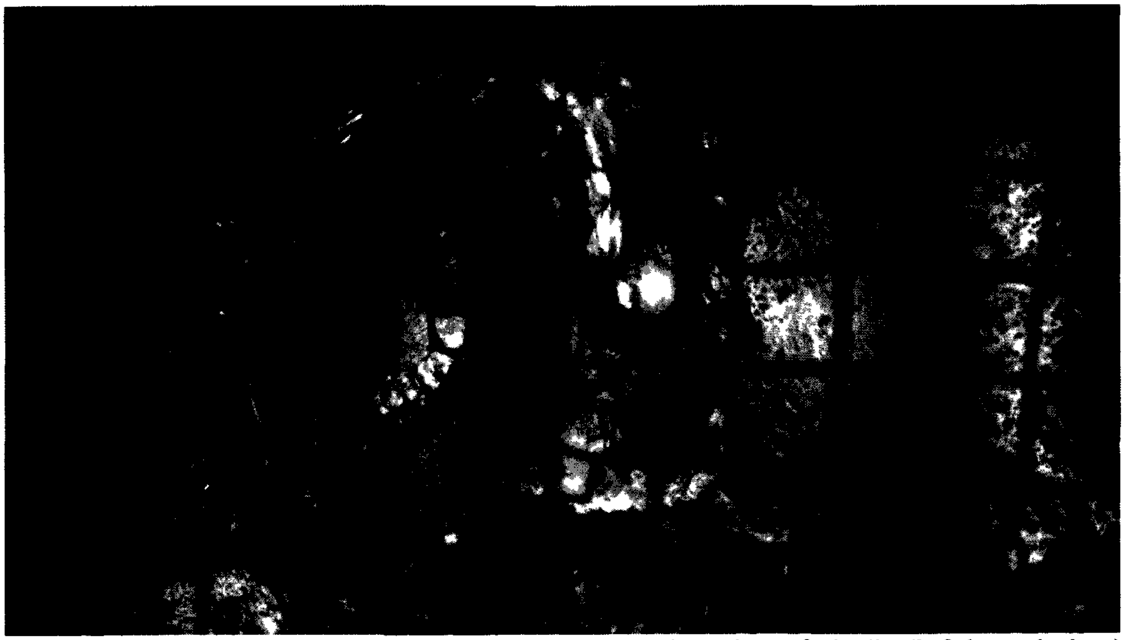

Figure 3.18 A mid-range image of the head and neck region of pig #5 (left lateral view). There is bone exposure of more than one-half of the head and neck region with greasy substances and decomposed tissue present.

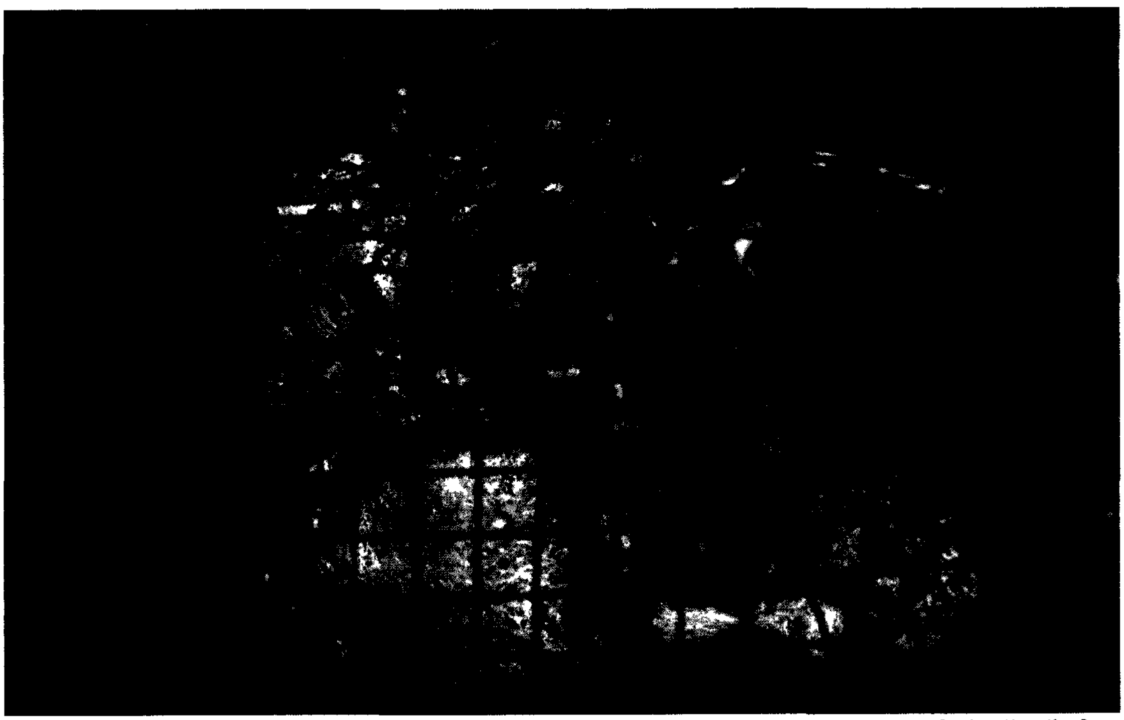

Figure 3.19 This mid-range image illustrates the neck and trunk region of pig #5 (left lateral view). There are bones with decomposed tissue, body fluids, and grease still present in the neck and trunk region.

Figure 3.20 This mid-range image displays the trunk and hind limb region of pig #5 (left lateral-ventral view). There are bones with decomposed tissue, body fluids, and grease still present in the trunk and limb region.

Figure 3.21 This mid-range image of the trunk and hind limbs region of pig #5 (ventral view) illustrates that over one-half of the hind limb region shows bone exposure with decomposed tissue and body fluids remaining.

Figure 3.22 This mid-range image illustrates the forelimbs of pig #5 (left lateral view). Similar to the hind limbs, over one-half of the forelimb region shows bone exposure with decomposed tissue and body fluids remaining.

Pig #6 had a total body score of 30 points with the following tabulated score: head and neck region (12 points), trunk region (10 points) and limb region (8 points). This score was qualitatively represented by the following characteristics outlined in the methodology by Megyesi et al. (2005): bone exposure of more than half of the head and neck region with desiccated or mummified tissue; bones with desiccated or mummified tissue covering less than one-half of the trunk region; and bone exposure over one-half of the limb region, with some decomposed tissue and body fluids remaining (Figures 3.23 to 3.28). Overall, the quantitative scores and qualitative features of pigs #5 and #6 ensured that they met the criteria required to be recognized as "skeletonized" bodies prior to their exposure to thermal treatment.

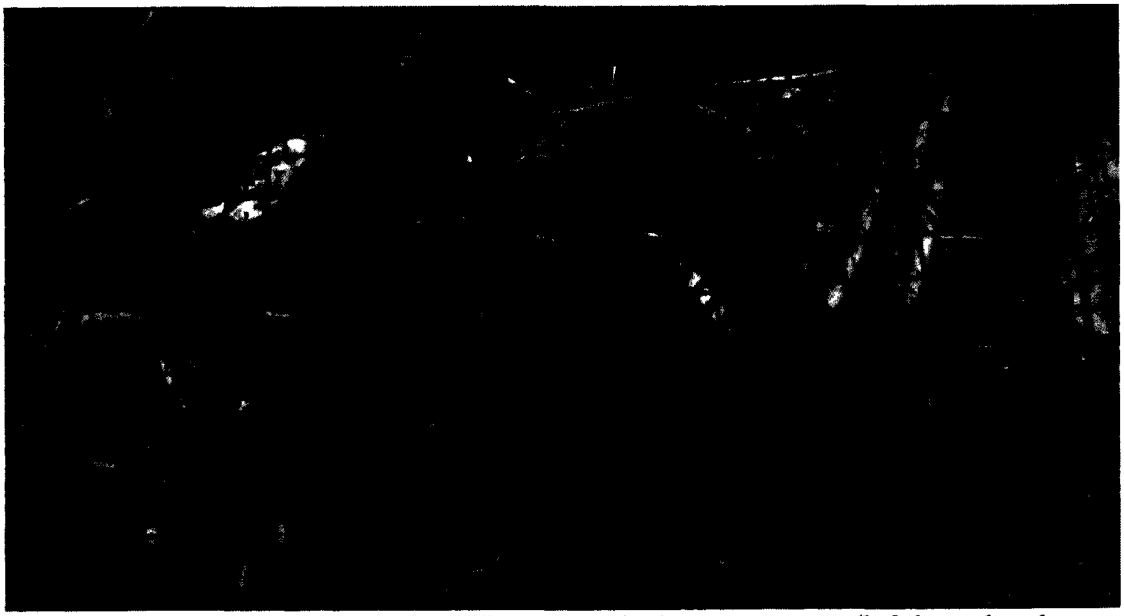

Figure 3.23 An overall image of pig #6 prior to its burn treatment (left lateral and posterior view).

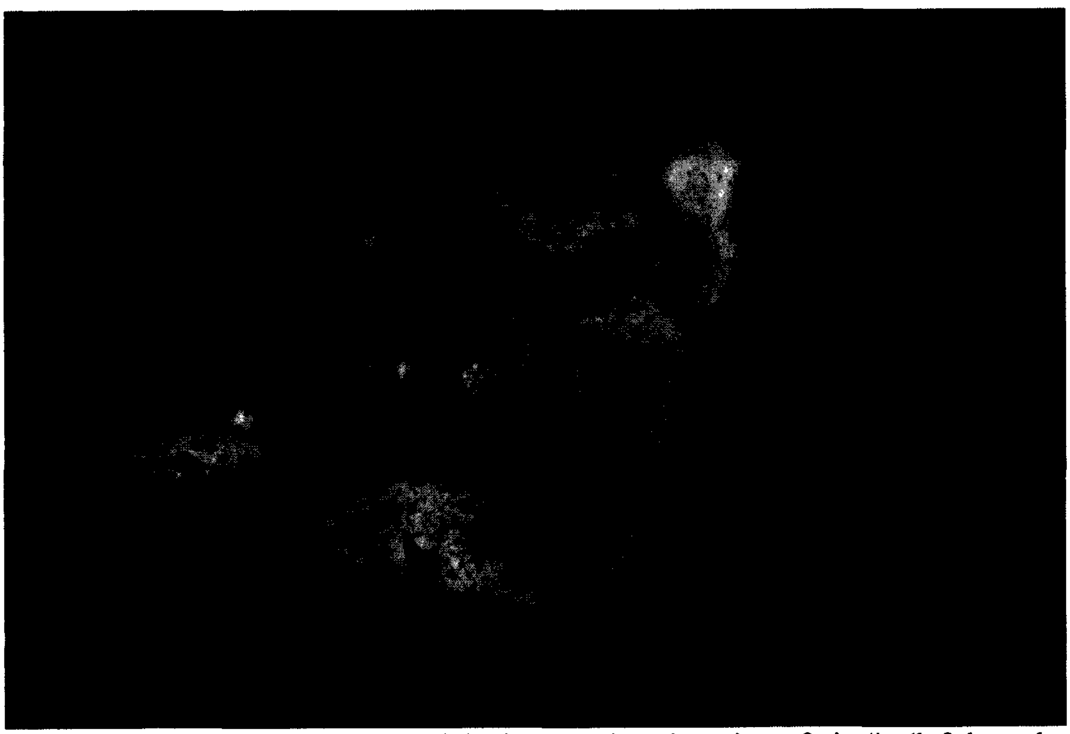

Figure 3.24 A mid-range image of the head and neck region of pig #6 (left lateral view). More than one-half of the head and neck region shows bone exposure with desiccated and mummified tissue present.

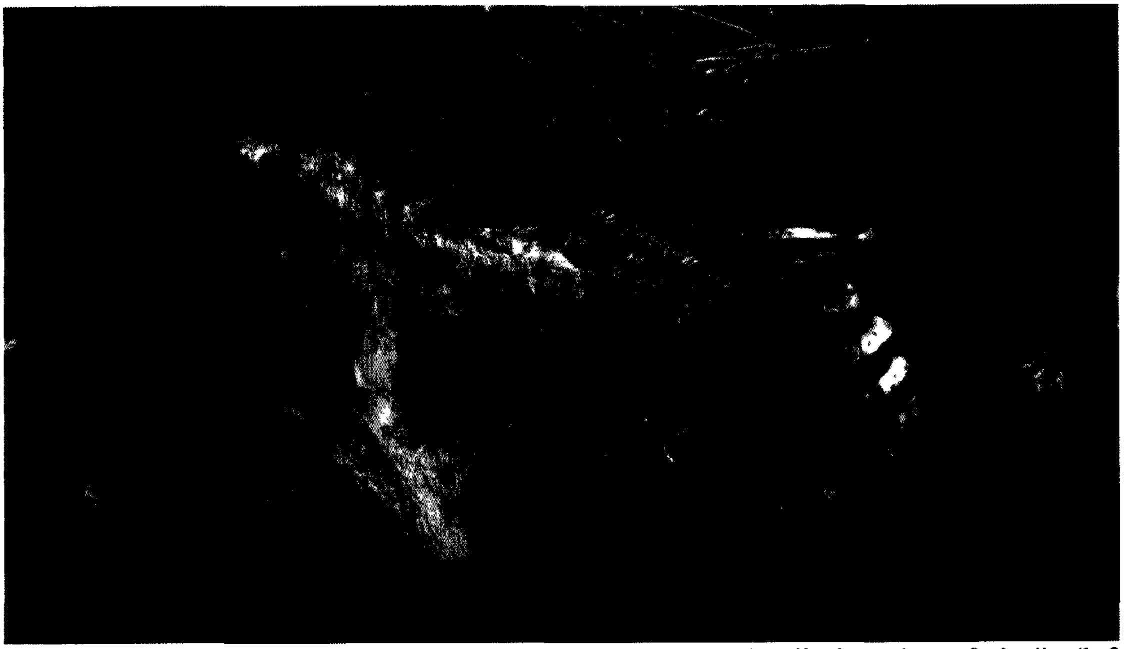

Figure 3.25 This mid-range image displays the trunk and forelimb region of pig #6 (left lateral view). There are bones with desiccated or mummified tissue covering less than one-half of the trunk region.

Figure 3.26 This mid-range image highlights exposed ribs (yellow circle) and vertebrae of pig #6 (dorsal view).

Figure 3.27 A mid-range image of the forelimbs of pig #6 (left lateral view). Over-half of the forelimb region has bone exposure with some decomposed tissue and body fluids remaining.

Figure 3.28 A mid-range image illustrates the hind limbs of pig #6 (dorsal view). Similar to the forelimbs, over one-half of the hind limb region has bone exposure with some decomposed tissue and body fluids remaining.

3.3.4.5. Burn Treatment to "Skeletonization" pig pair

The burn treatments for pigs #5 and #6 were carried out with the help of two fire instructors from the NSFS. Burn treatments proceeded in a systematic order, from pig #5 to pig #6, allowing each fire to ignite and self- extinguish before the next fire was set. The burn protocol, used by the NSFS, involved creating a halo of fire in the vegetative brush surrounding each pig cadaver. This allowed the fire to consume the fuel, provided from the organic brush, before proceeding to consume the pig cadaver. Both fires lasted approximately 15 minutes before they self-extinguished, with each fire possessing its own unique localized burn areas. Pig #5 had an intense localized fire around the posterior aspect of the trunk region and a smaller fire around the posterior aspect of the head. An accumulation of decomposed fat and tissue, located on the ventral aspect of the trunk, also flamed and smouldered beneath the surface. The ventral aspect of the trunk was also the last region of pig #5 to self-extinguish (Figures 4.29 to 4.35). Pig #6 had two very intense localized fires around the anterior-ventral aspect of the trunk and the right hind limb. This fire quickly became intense due to the presence of volatile fatty acids that leached into the soil surrounding the cadaver. The anterior-ventral aspect of the trunk was the last region, of pig #6, to self-extinguish (Figures 4.36 to 4.43). Once fire personnel confirmed that the fires were extinguished and all safety precautions were taken to secure the area, the cages were re-secured over the burned remains of pigs #5 and #6.

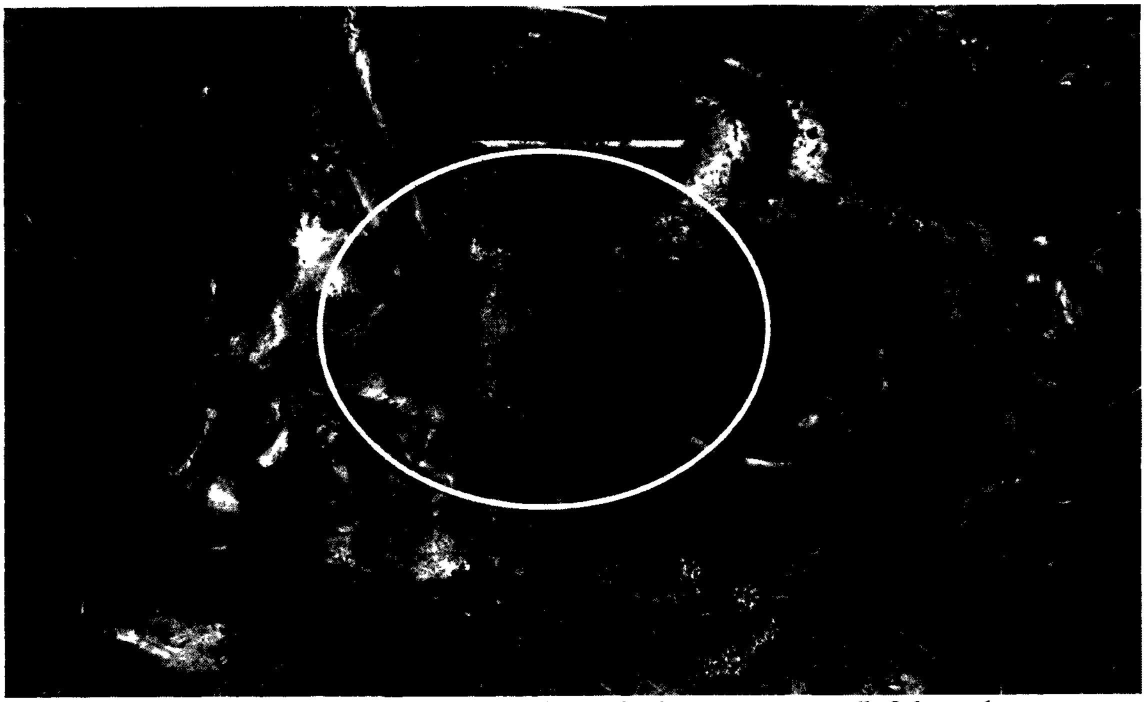

Figure 3.29 An overall image of pig #5 prior to its burn treatment (left lateral-ventral view with head on the right side of image). Also note the adipocere pooling around the ventral aspect of the trunk (yellow circle).

Figure 3.30 This overall image depicts the low vegetative brush, a mix of lush green and dead organic materials that surrounded pig #5.

Figure 3.31 This mid-range image depicts the fire as it traced along the dorsal aspect of the trunk of pig #5 (yellow arrow) prior to becoming localized in the head region and the posterior aspect of the trunk region.

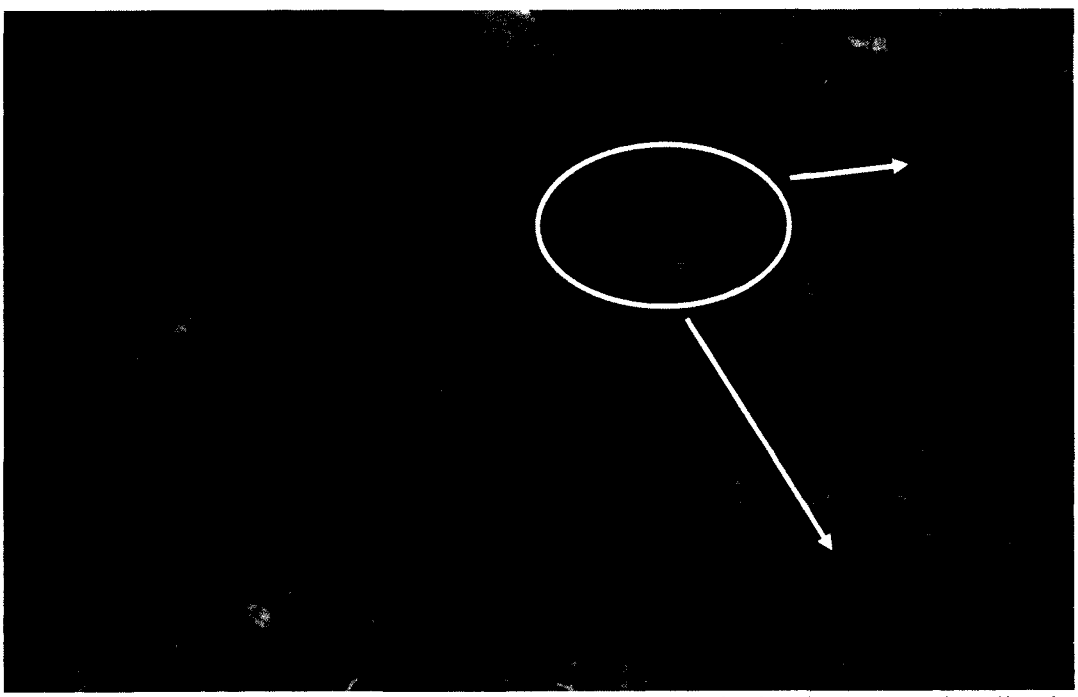

Figure 3.32 This mid-range image illustrates the fire as it slowly became localized around the posterior aspect of the trunk region of pig #5 (yellow circle) and the proximal region of the hind limbs (yellow arrows).

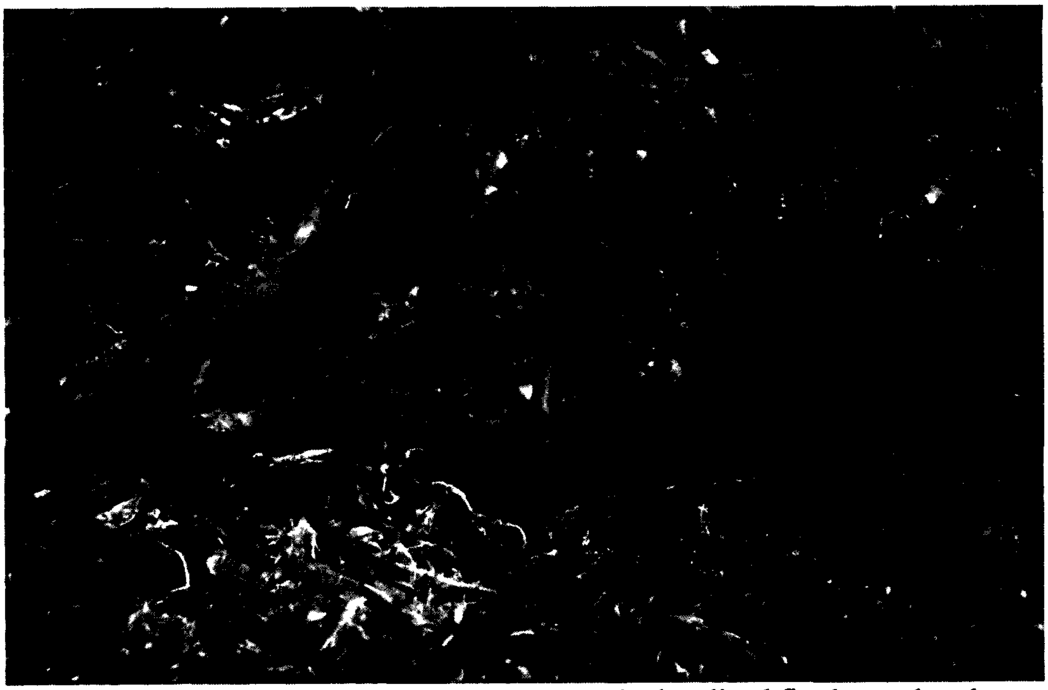

Figure 3.33 A mid-range image that illustrates the localized fire located at the posterior aspect of the head region on the gonial angle of the jaw (pig #5 is laying on the right lateral side).

Figure 3.34 A mid-range image of the localized fire in the posterior aspect of the trunk region and the proximal aspect of the hind limbs of pig #5 (ventral view of pelvic girdle).

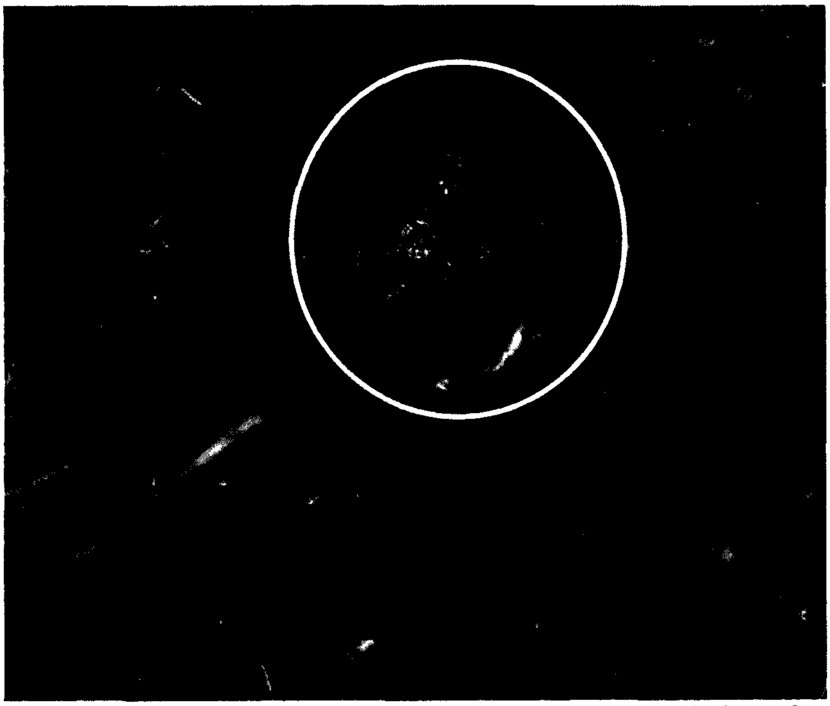

Figure 3.35 This overall image illustrates the accumulation of adipocere, located on the ventral aspect to the vertebral column, which was flaming and smouldering beneath the surface (yellow circle).

Figure 3.36 An overall image of pig #6 prior to the burn treatment (left lateral view with head region on right side of image).

Figure 3.37 This overall image depicts the minimal amount of lush green brush that was present around pig #6 when the fire was ignited.

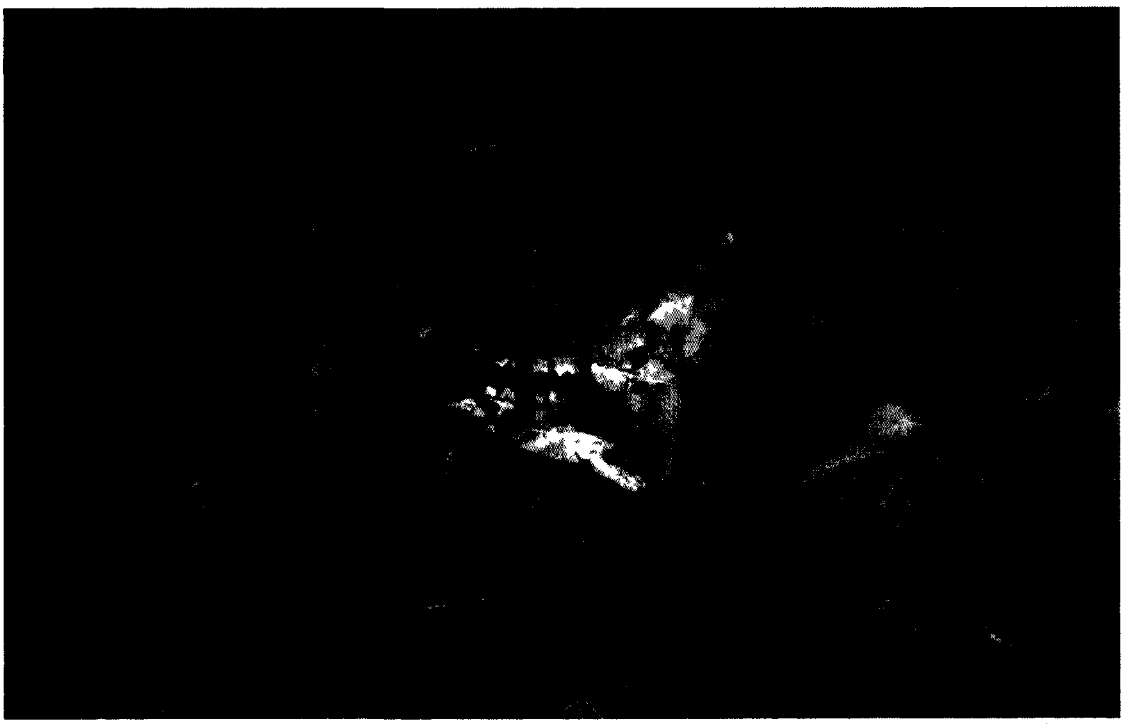

Figure 3.38 This mid-range image shows the fire as it consumes the mummified flesh on the left lateral aspect of the head region.

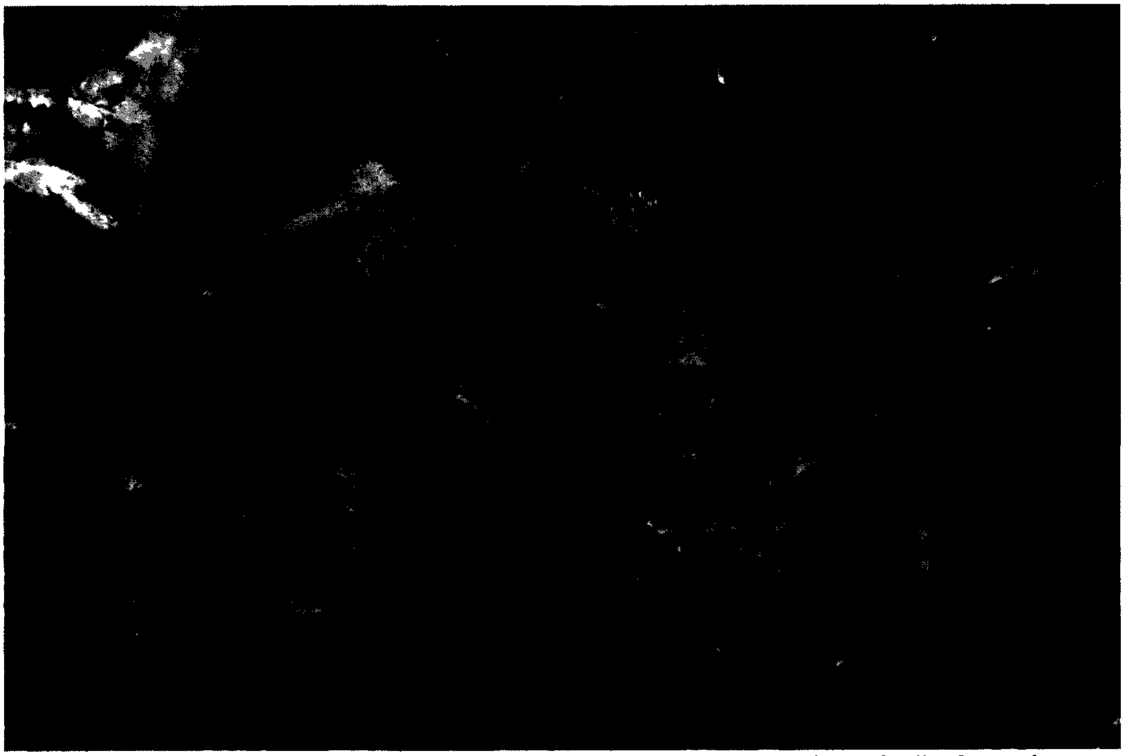

Figure 3.39 This mid-range image reveals the fire as it approaches pig #6 from the ventral aspect of its trunk region.

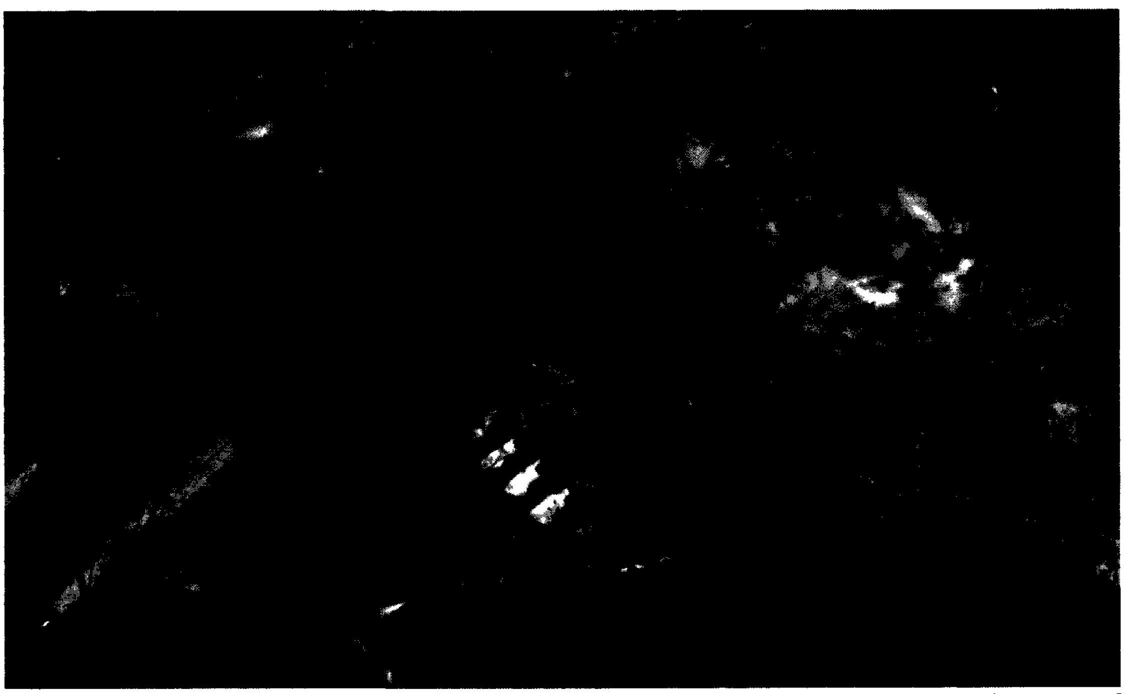

Figure 3.40 This mid-range image depicts the fire as it approaches the ventral aspect of the trunk region and the hind limbs region.

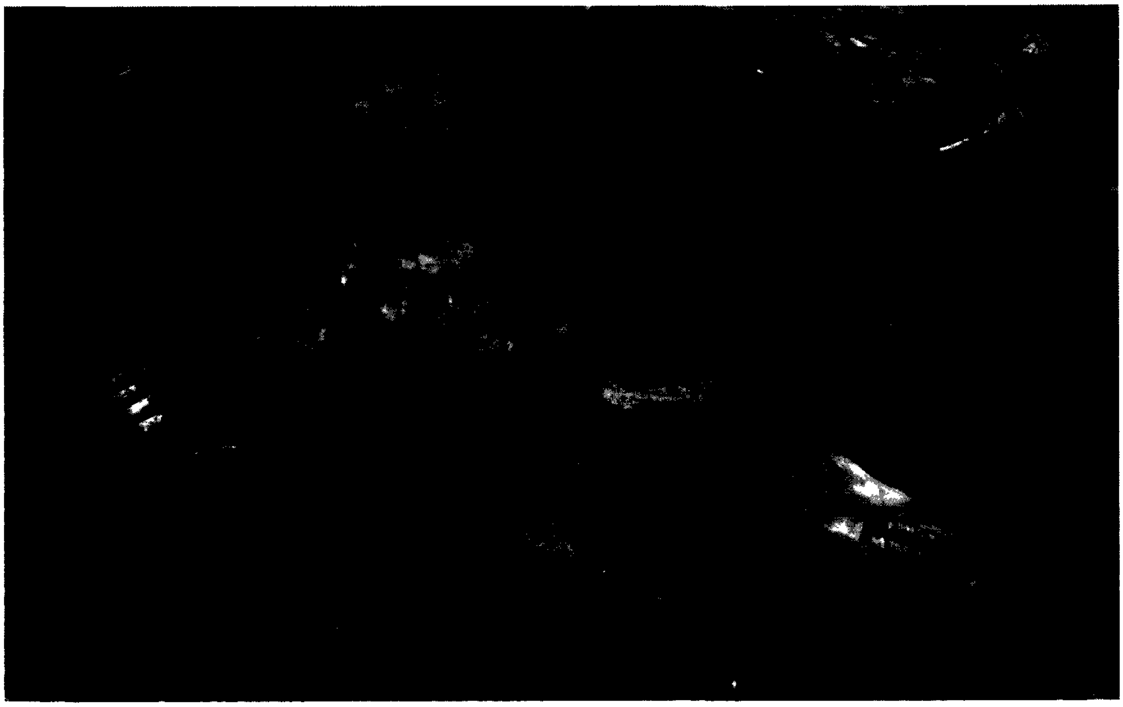

Figure 3.41 A mid-range image that highlights the fire as it intensifies over the trunk region of pig #6. It is consuming and removing the mummified tissue to reveal the ribcage and thoracic vertebrae.

Figure 3.42 This overall image highlights the two localized fires of pig #6 (posterior view). The first fire is localized in the anterior aspect of the trunk (yellow circle) and the second around the right hind limb (yellow arrow).


Figure 3.43 This overall image illustrates the trunk region of pig #6 that is extensively damaged by a localized fire (left lateral view of pig #6 with head region on right side of image).

3.3.4.6. Assessment of Decomposition in "Advanced Decomposition" Pig Pair

A total body score of 19 to 24 points illustrates advanced decomposition according to the methodology by Megyesi et al. (2005). Pig #7 had a total body score of 24 points with the following tabulated score: head and neck region (9 points), trunk region (8 points), limb regions (7 points). This score was qualitatively defined by the following features: mummification with bone exposure less than one-half of the head and neck, trunk and limbs regions (Figures 3.44 to 3.46).

Figure 3.44 A mid-range image of the head and neck region of pig #7 (left lateral view). Less than one-half of the head and neck region had bone exposure with mummification.

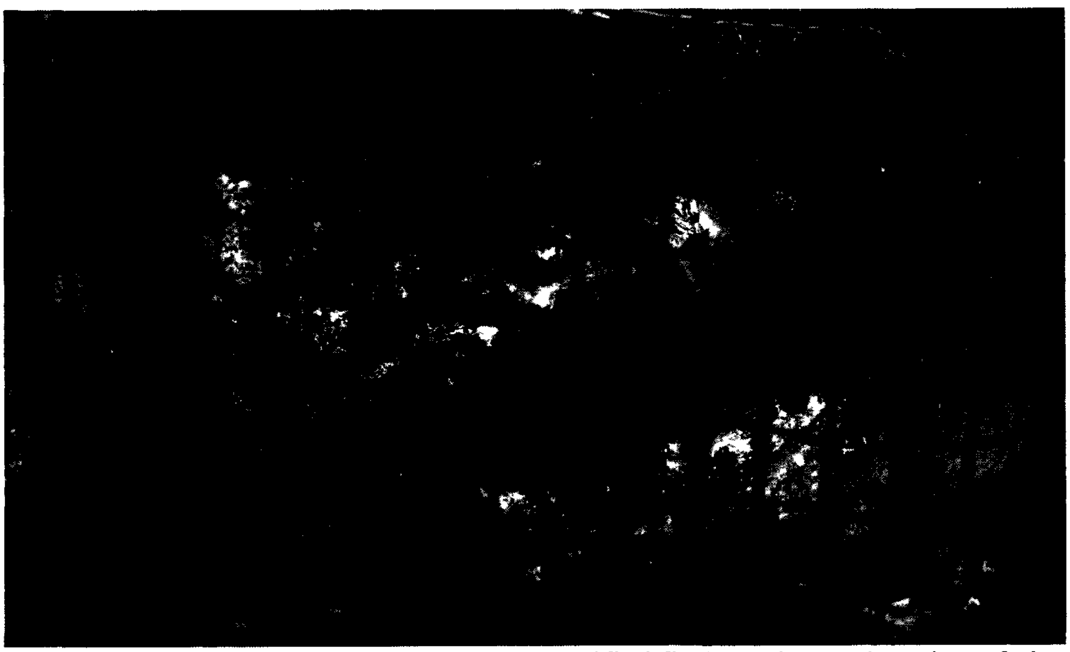

Figure 3.45 A mid-range image of the mummified flesh on the trunk region of pig #7 (left lateral view).

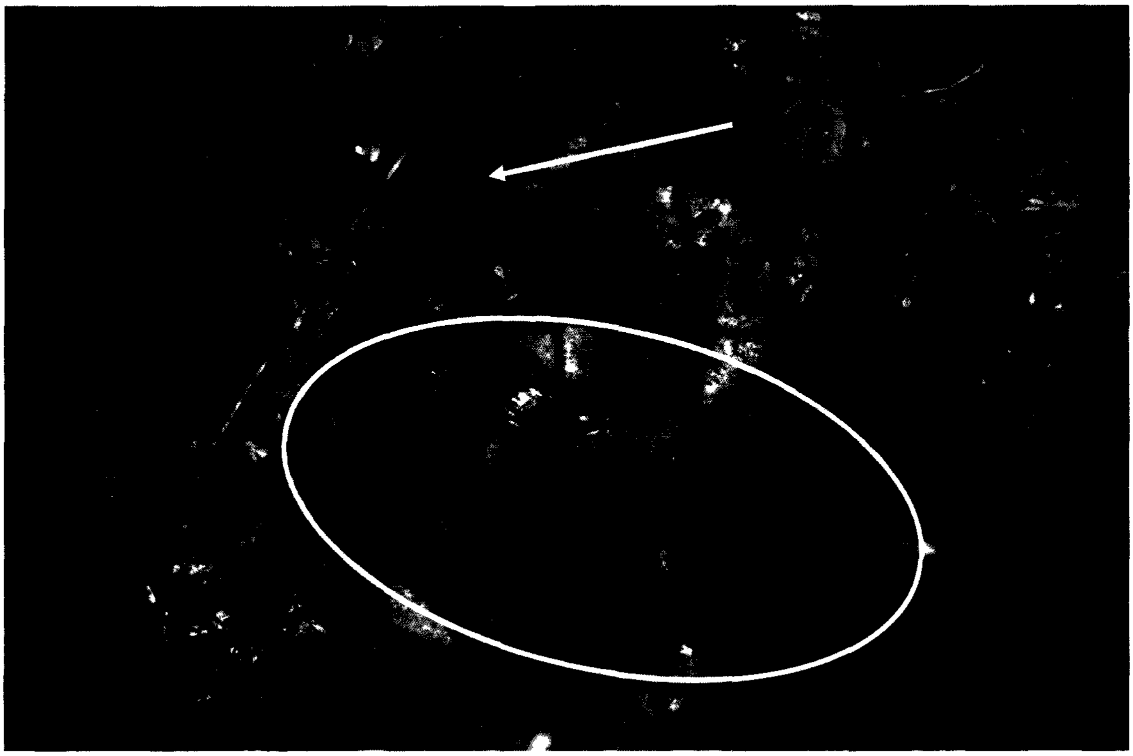

Figure 3.46 A mid-range view of the hind limb region of pig #7 (left lateral view). A portion of the left ilium is exposed (yellow arrow) and the left hind limb is covered in mummified tissue (yellow circle).

Pig #8 had a total body score of 25 points, with the following breakdown: head and neck region (10 points), trunk region (8 points), limb region (7 points). This score was qualitatively illustrated by the presence of the following features: bone exposure of more than one-half of the head and neck region, with greasy substances and decomposed tissue present, and mummification with bone exposure less than one-half of the trunk and limb region (Figures 3.47 to 3.50). Overall, the quantitative scores and qualitative features, of pigs #7 and #8, show that they meet the criteria required to be recognized as "advance decomposition" bodies prior to the thermal treatment exposure.

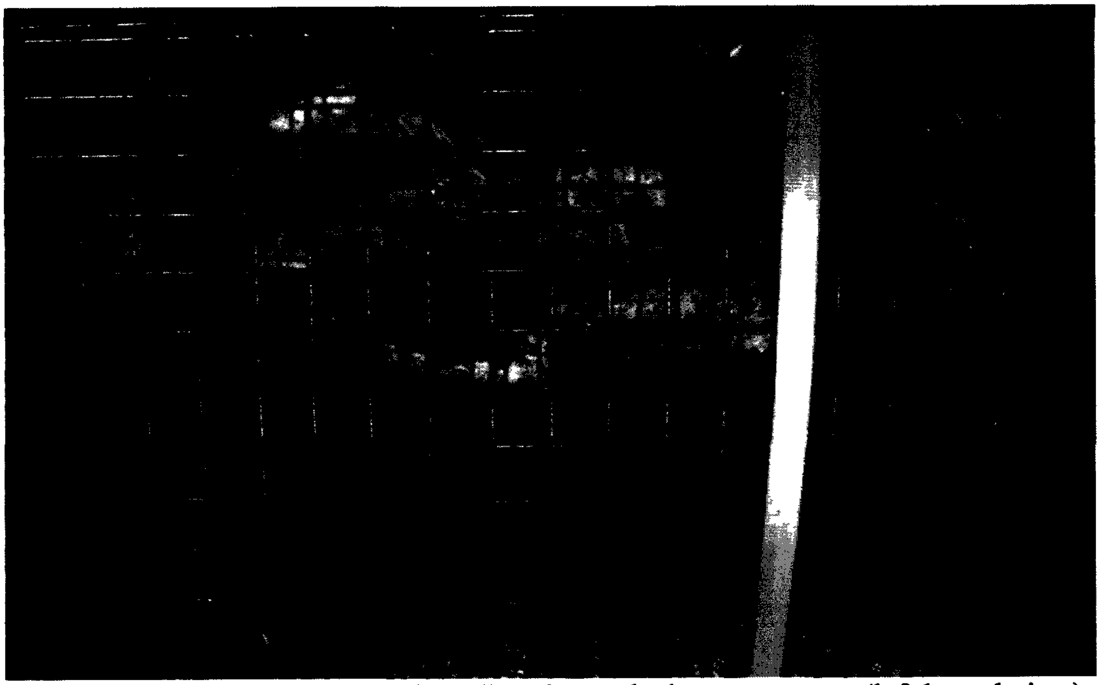

Figure 3.47 An overall image of pig #8 prior to the burn treatment (left lateral view).

Figure 3.48 A mid-range image of the head and neck region of pig #8 (left lateral view). More than one-half of the head and neck region has bone exposure with greasy substances and decomposed tissue present.

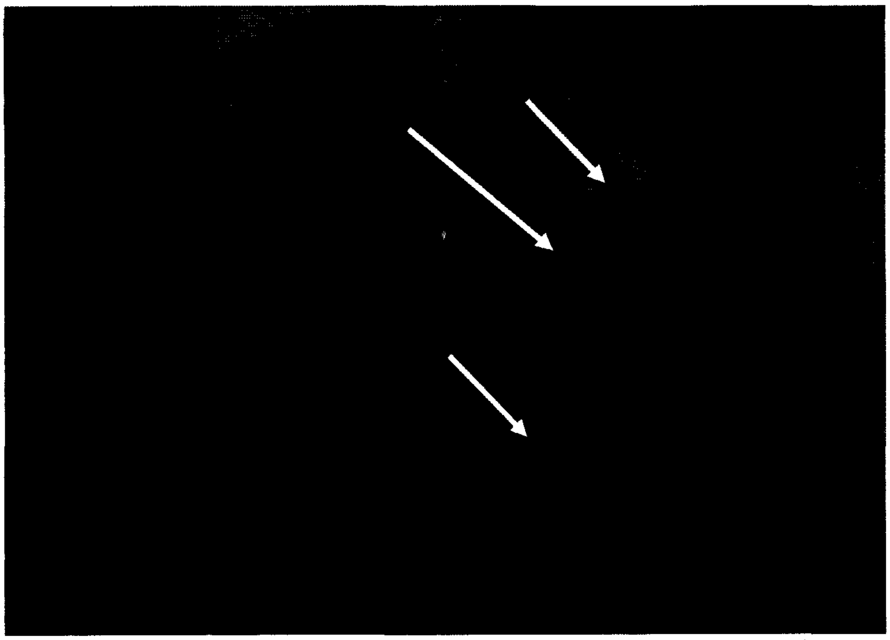

Figure 3.49 A mid-range image of the trunk region of pig #8 (left lateral view). Less than one-half of the trunk region has bone exposure with mummification. The flesh is thin enough to observe a portion of the ribcage (yellow arrows).

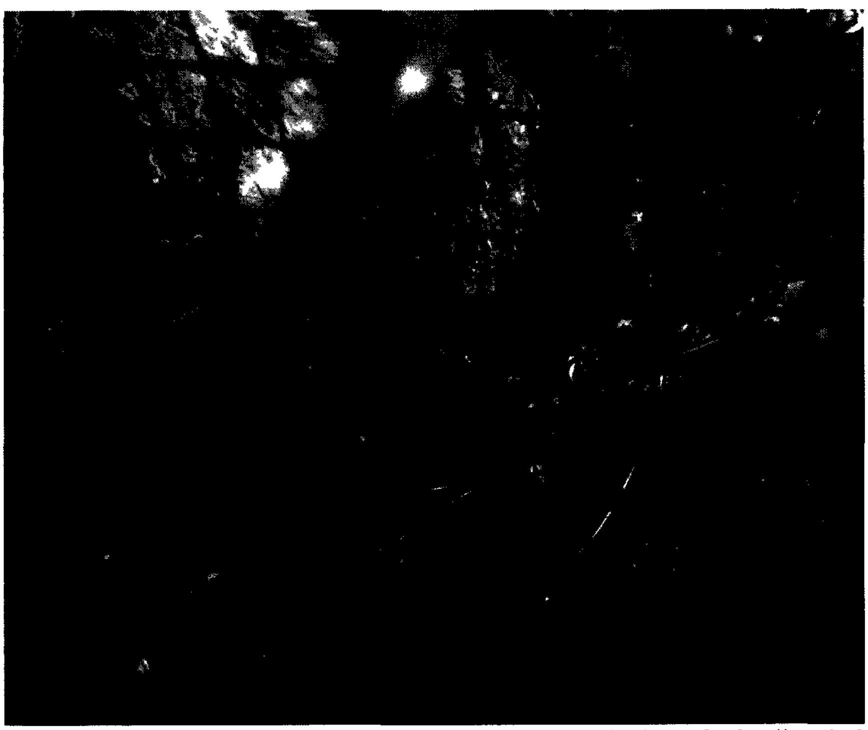

Figure 3.50 A mid-range image of the hind limbs of pig #8 (left lateral view). Less than one-half of the limb region has mummification with bone exposure.

3.3.4.7. Burn Treatment to "Advanced Decomposition" pig pair

The burn treatments for the "advance decomposition" pig pair, pigs #7 and #8, occurred on the same day, 9 July 2009, as the burn treatments for the "skeletonization pair", pig #5 and #6. These two fires were set in sequential order, first pig #7 and then pig #8, allowing the first fire to self extinguish prior to the ignition of the second fire. The fire protocols used on the "advanced decomposition" pig pair were the same as those employed by NSFS fire instructors on pigs #5 and #6. The duration of the fire, for pig #7, was approximately 10 minutes while the fire for pig #8 lasted for approximately 15 minutes. There was a high amount of lush green vegetation, rocks, and dead brush present around both pig cadavers. Pig #7 had an intense localized fire in the neck region (Figures 3.51 to 3.55) while pig #8 had localized fires on the head and neck region and the hind limb region (Figures 3.56 to 3.62). Once fire personnel confirmed that the fires were extinguished and all safety precautions were taken to secure the area, the cages were re-secured over the burned remains of pigs #7 and #8.

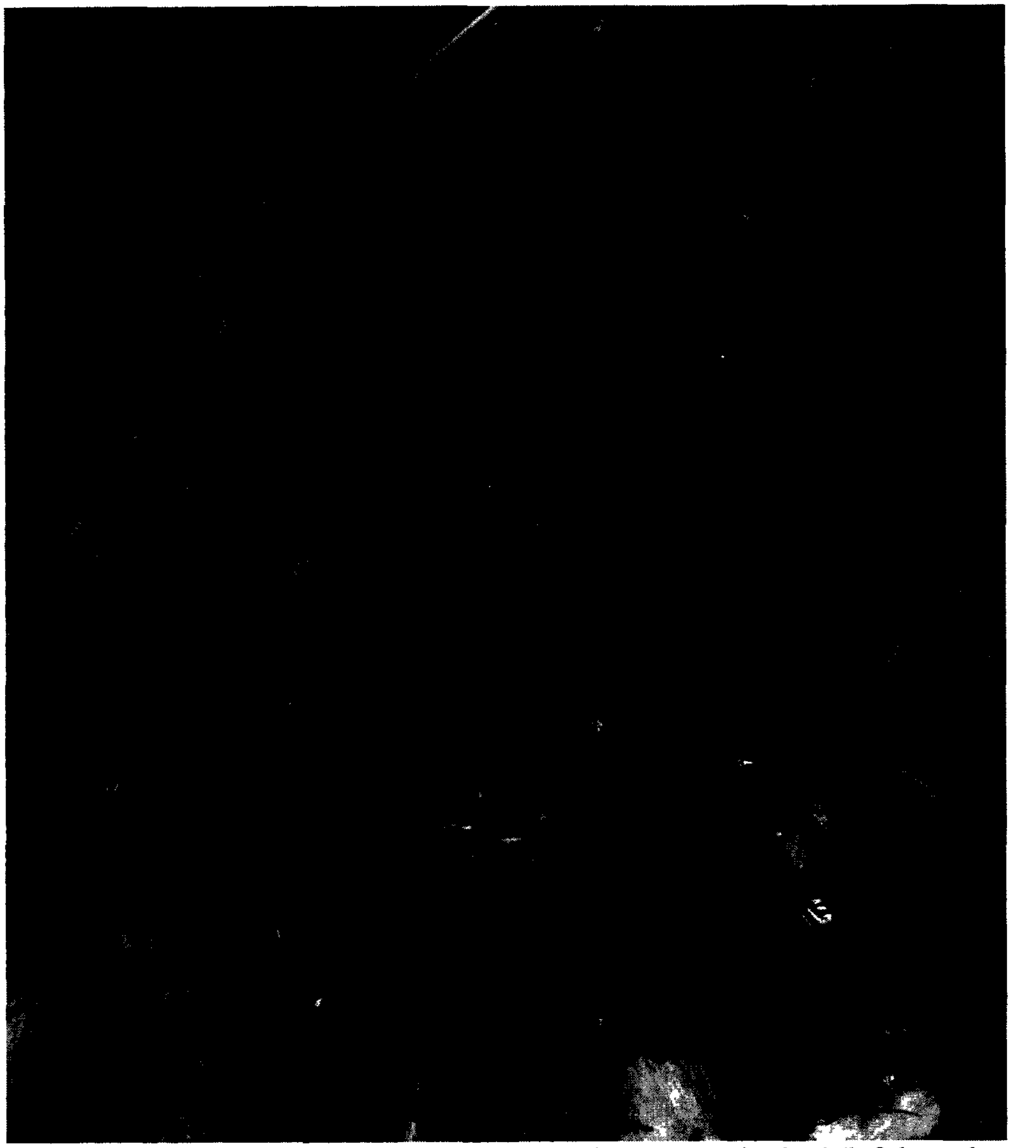

Figure 3.51 An overview image of pig #7 as the fire was ignited (left lateral view). Note the mix of lush green vegetation, rocks and dead brush around the circumference of pig #7.

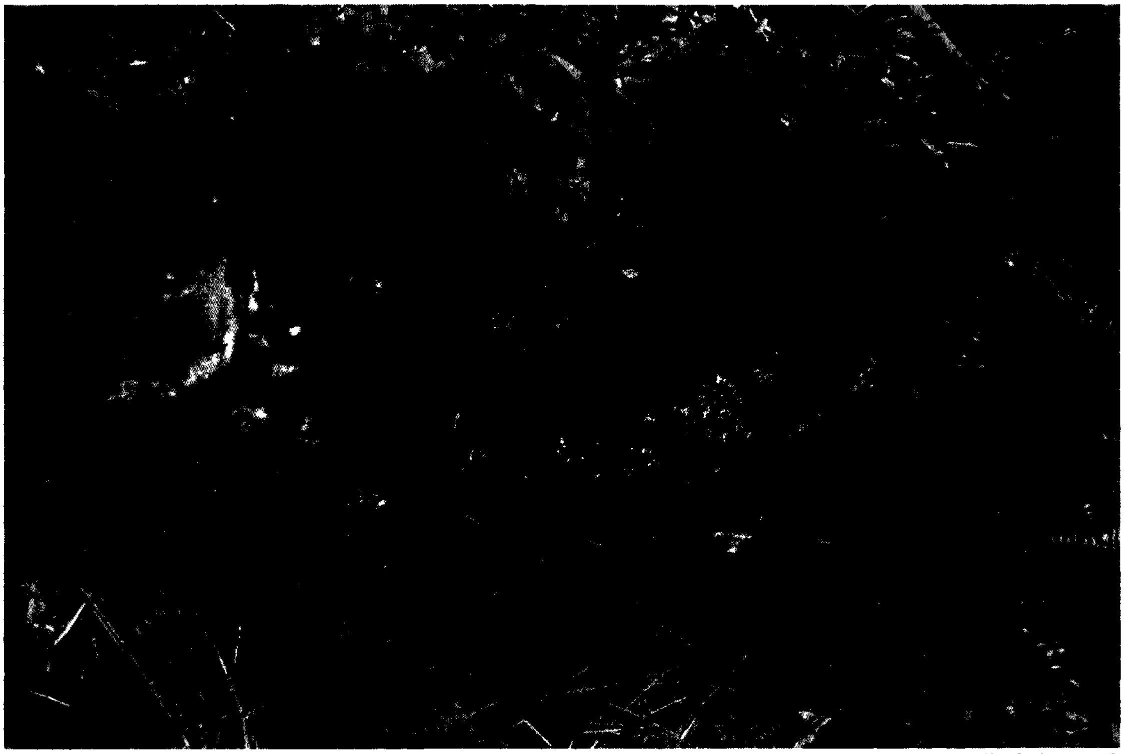
Figure 3.52 A mid-range view of pig #7 as the fire pyrolized the vegetation (left lateral view).

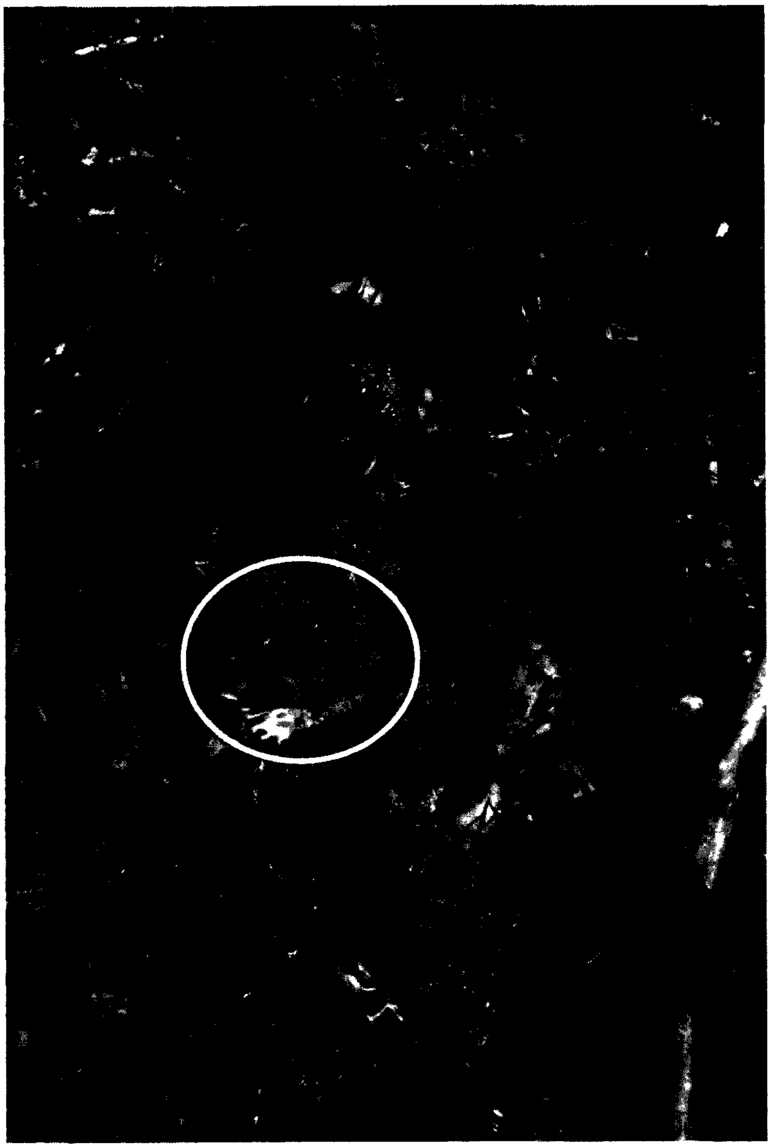

Figure 3.53 An overall image of the fire as it interacted with the remains of pig #7and breached the decomposed flesh present on the ventral aspect of the trunk (yellow circle).

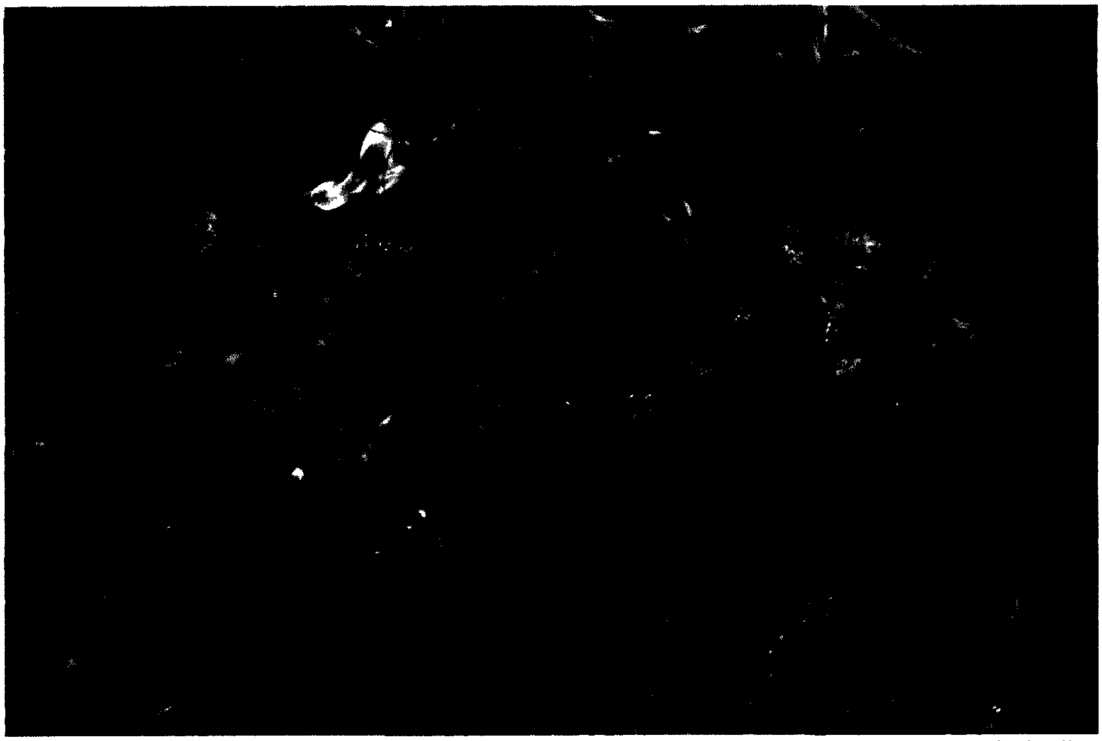

Figure 3.54 An overall image of the fire which localized in the neck region of pig #7 (left lateral view).

Figure 3.55 A mid-range image of the fire which localized in the neck region of pig #7 (left lateral view); this was the last area to self-extinguish.

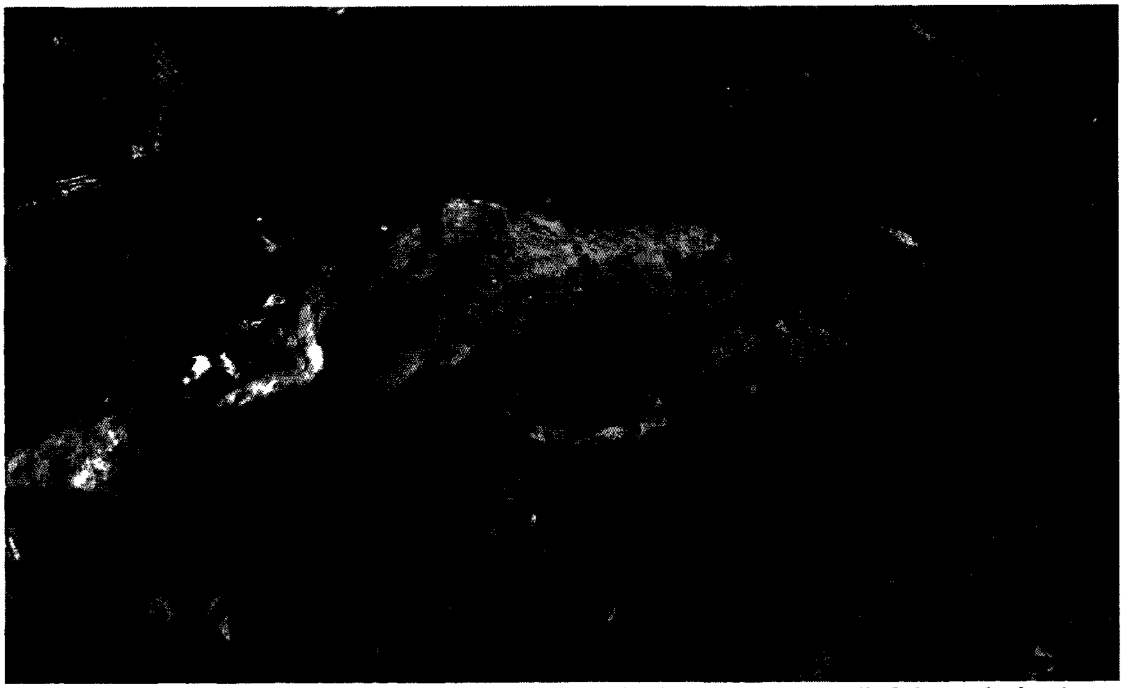

Figure 3.56 An overall image of pig #8 prior to its burn treatment (left lateral view). Note the degree of mummified and desiccated flesh present.

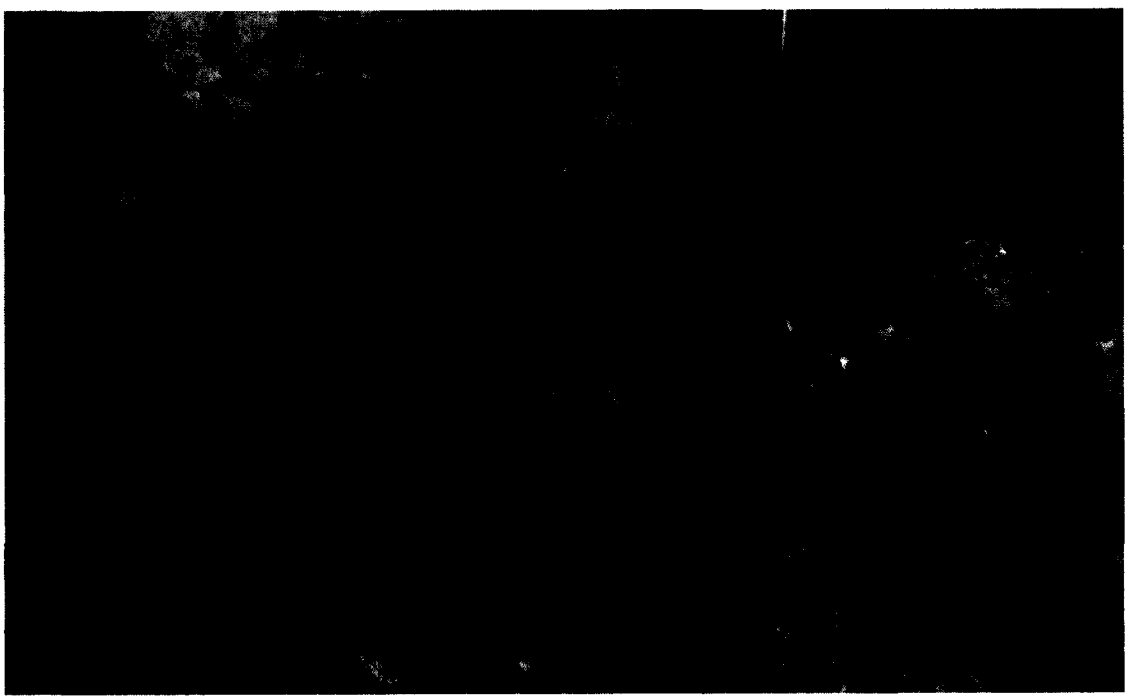

Figure 3.57 An overall image that depicts the mix of vegetation and rocks around the circumference of pig #8 as the fire was ignited.

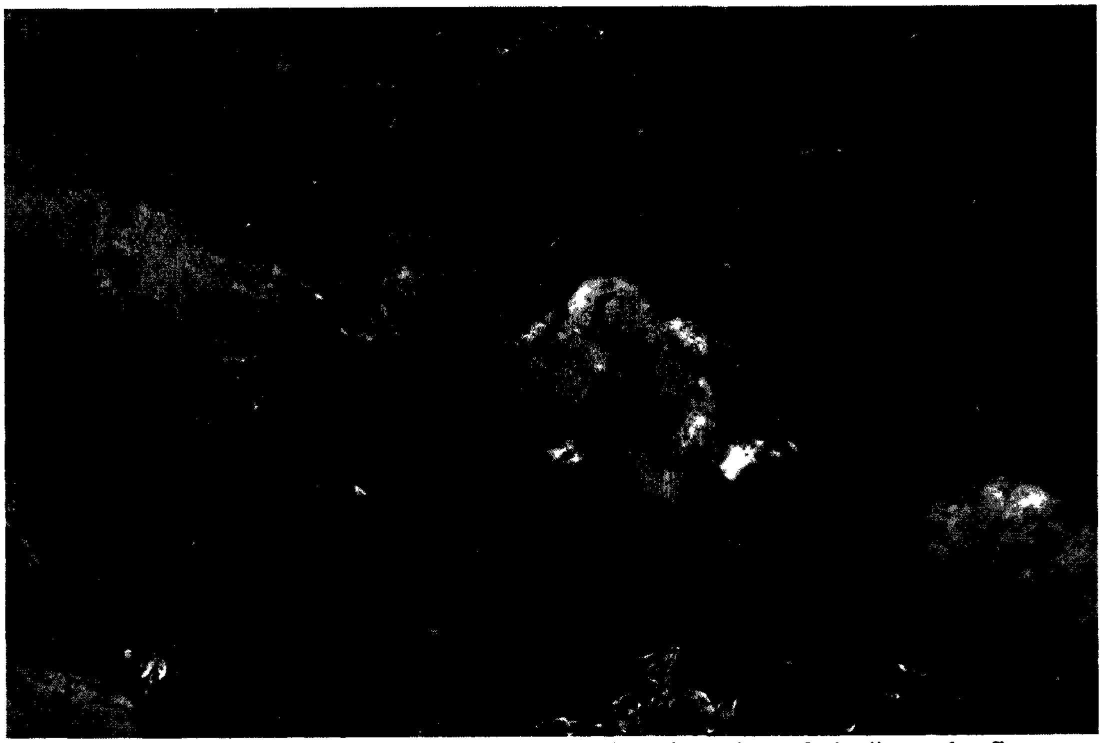

Figure 3.58 A mid-range image of the head and neck region of pig #8 as the fire began to breach the mummified flesh.

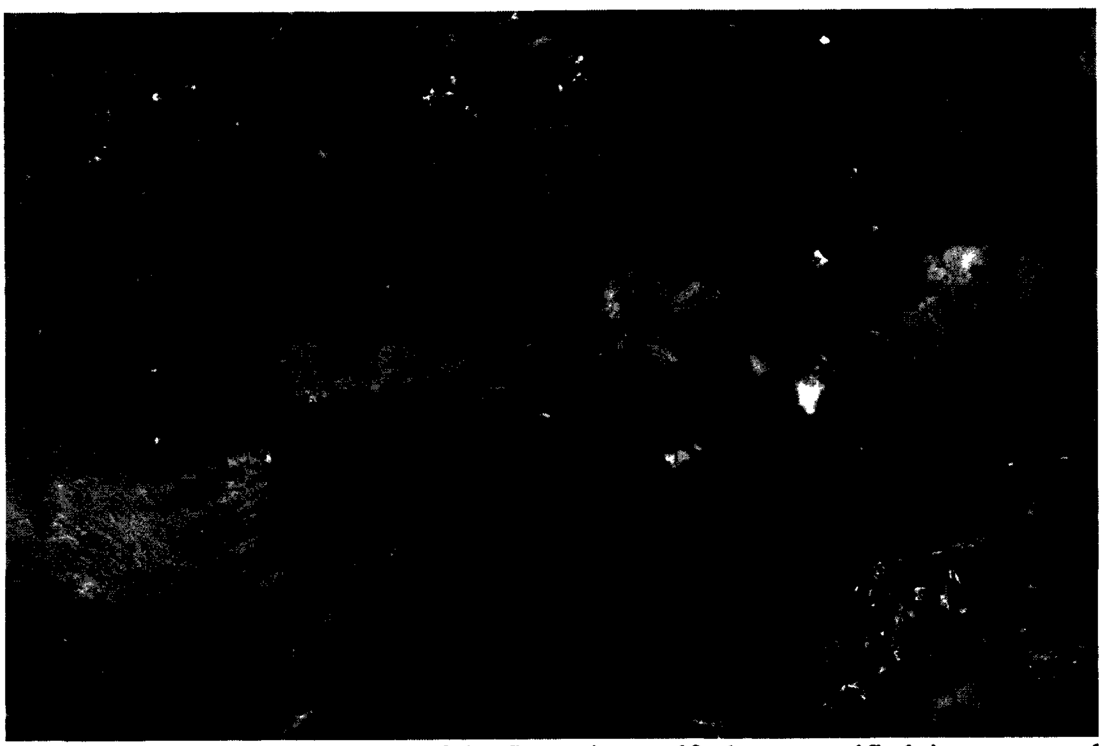

Figure 3.59 A mid-range image of the fire as it engulfs the mummified tissues around the head and neck region of pig #8.

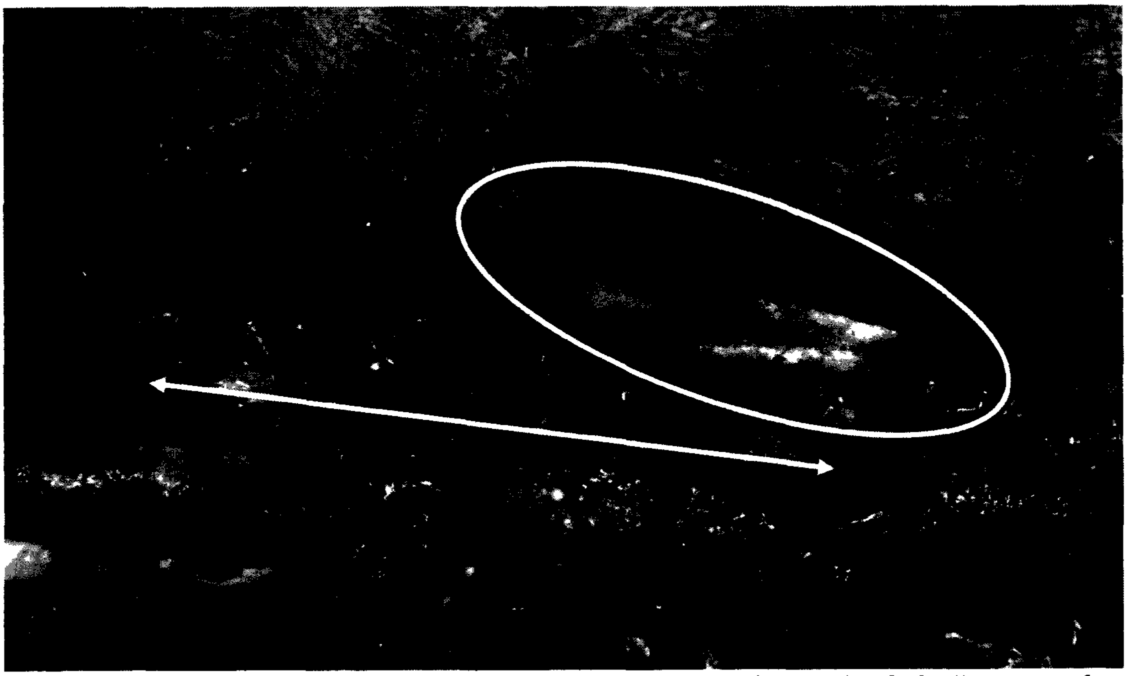

Figure 3.60 A mid-range image of the posterior aspect of the trunk of pig #8. Note the flesh on dorsal aspect of the trunk was breached to reveal lumbar vertebrae (yellow arrow) and the costal end of a two ribs (yellow circle).

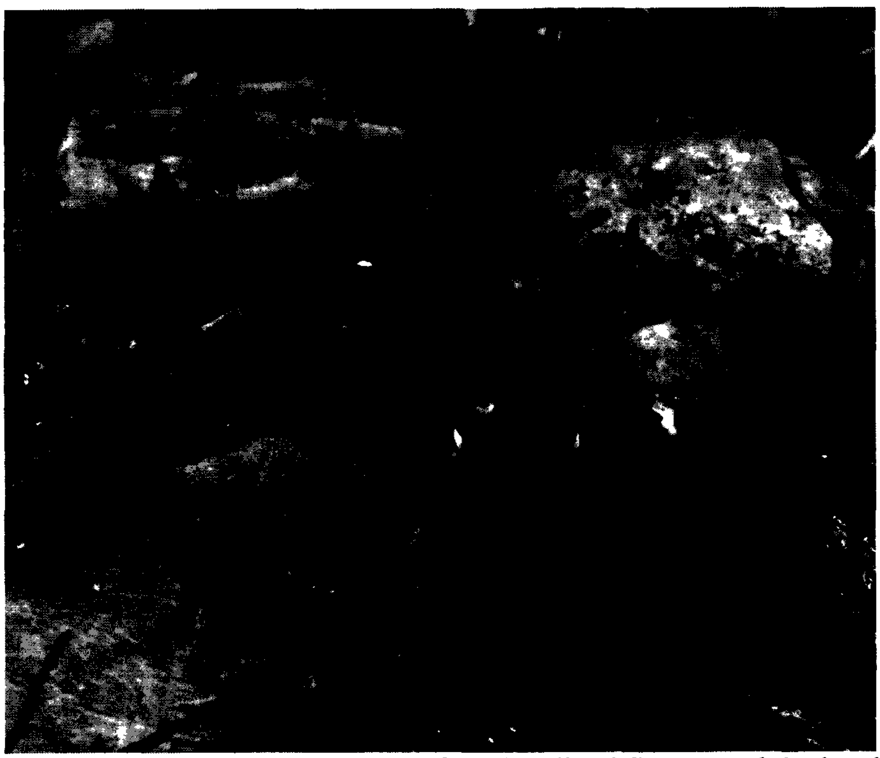

Figure 3.61 A mid-range image of the localized fire around the head and neck region of pig #8.

Figure 3.62 A close-up image of the localized fire in the head and neck region of pig #8; this was the last region of the body to self-extinguish (left lateral view).

Once the simulated brush fires, applied to the "skeletonization" and "advanced decomposition" pig paired groups, had self-extinguished, the cages were re-secured over all four pigs. The pigs were then left exposed to the natural environment for the remainder of the field component for several reasons. Firstly, this study isolated and evaluated the environmental conditions for one summer season. Secondly, the three-month period also safeguarded the opportunity to achieve more than 1285 Accumulated Degree Days (ADD), the time frame suggested by Vass et al. (1992) to observe major decomposition and skeletonization. Thirdly, this study was trying to recreate the possible scenario discussed in the Nova Scotia Medical Examiner Service case study, described in Chapter One. The case study centered on found skeletonized and completely disarticulated remains that were recovered from a wooded area and which may have come in contact with brush fires. Fourth, the burned remains were left exposed to the elements for further weathering from the environment because the author wanted to ensure that all three burned pig paired groups were exposed to the elements for the same length of time as the "control" pig paired group. Fifth, and lastly, the author wanted to ensure that a maximum state of skeletonization was evident in all four-pig paired groups prior to their removal. This would allow for minimal disturbance to the discolouration patterns present on the surface of the skeletal remains for all pig paired groups, when the time came to dry macerate the remains.

Upon the completion of the field component of this study, the field data was entered into several inventory tables and charts to catalogue the daily decomposition scores for: (1) the total body, (2) the head and neck, (3) the trunk, and (4) the limbs. Field data was also separated based on the months of June, July, and August (Appendix B). Although the patterns and rates of decomposition within a semi-urban Maritime environment were not of interest to the current research, the author has inventoried the data to include a listing of the TSD and ADD. This was conducted in order to make the data available to future decomposition studies with which to make comparisons.

3.4. Experimental Design of Lab Analysis

On 11 September 2009, the remains of the eight pig cadavers were taken to the Victoria General Site Morgue (Queen Elizabeth II Health Sciences Center) facility, in Halifax, for storage and analyses. This process began with a dry maceration using a scalpel, dental pick, and tweezers, to avoid disturbing or removing any discolouration patterns on the surface of the bones. Although maximum care was taken to minimize the damage to the skeletal remains during transportation to the morgue, it was difficult to preserve the integrity and structure of some of the skeletal remains. Photographs were taken to document the full skeletal inventories of all eight pigs before starting the macroscopic burn pattern analysis. This was to minimize the complications that could arise due to the fragile nature of several thermally treated skeletal elements. This included photographs taken from all relevant anatomical orientations, such as cranial, medial, lateral, caudal, ventral and dorsal.

3.4.1. Burn Pattern Analyses

To identify any heat related skeletal trauma on the surface of the skeletal pig remains, there was a heavy reliance on the use of two faunal skeletal anatomy reference texts: Adams and Crabtree (2008) and Sisson and Grossman (1953). These reference texts were used to identify each bone based on its unique anatomical features, siding and orientation. Although pig skeletal anatomy is similar to its human counterpart, they still differ in terms of size and shape because of form and function. Thus, it was important to use the skeletal anatomy reference texts throughout the entire skeletal analysis process to ensure correct skeletal identification.

Once bones were anatomically laid out on a gurney, the pugilistic posture model and the concept of colour banding were employed to identify the presence of any heat related skeletal trauma and to evaluate any burn pattern signatures. Colour banding was used to distinguish regions of bone that were unburned from regions that were charred or calcinated. Subsequently, the identification of charred versus calcinated bone established the extent to which bones were modified and, thus, outlined which regions of bone received primary versus secondary degrees of thermal trauma. The pugilistic posture was then used as a model example to determine the presence of a thermal destruction pattern between each pig paired groups, based on primary and secondary thermal trauma. Since the current author speculated that the pugilistic posture cannot account for limb flexion in the advanced to skeletonized stages of decomposition, the sidedness of thermal injuries was also given consideration. Therefore, to determine if a burn pattern existed for a specific stage of decomposition, the current author placed equal weight on each of the following criteria:

1) Anatomical region affected must be the same
2) Degree of thermal modification (charred versus calcinated) in the affected anatomical regions must be similar
3) Sidedness of thermal injuries must be relatively consistent

Once all heat related skeletal traumas were documented, they were then highlighted on a three-dimensional anatomical illustration for each pig (Figure 3.7). This allowed for easy cross comparison, and the generalization, of any heat related skeletal trauma and, furthermore, the identification of any burn pattern signatures.

Figure 3. 63 A three-dimensional illustration of a pig that was used to identify and compare areas of heat related skeletal traumas within each pig paired grouping (www.turbosquid.com).

3.4.2. Colour Analysis

3.4.2.1. Operation of the CR-11 Digital Colour Reader

Before use, the machine must be turned on and white calibrated with a white tile that is provided with the colour reader. The tip of the colour reader is placed flat against the surface of the white tile and the 'measuring' button is pressed once. Once calibration is complete, the colour reader is ready to take colour readings from any coloured specimen. By holding the colour reader flush to the surface of the specimen and pressing the 'measuring' button, a colour reading can be generated and recorded by the CR-11 (Konica Minolta 2003).

3.4.2.2. Evaluation of Colour Mimicry

Each skeletal element, from all eight pigs, was evaluated using the digital colour reader and over 1250 readings were collected per pig. Areas of evaluation included prominent landmarks or features and systematic readings were taken from proximal to distal regions on each bone (Appendix C). For example, if four readings were taken from one surface of a long bone, colour was measured proportionately at each quarter length of the bone. As each consecutive set of 50 colour readings was recorded by the CR-11, they were numbered and catalogued into a text file to keep track of which colour readings corresponded with which landmark or feature. Once all colour readings for a designated pig were transferred to a text file, they were inputted into an Excel table. The Excel table allowed for easy comparison of all colour readings, by simply copying and pasting Munsell colour readings into the "find" tool and searching for matches.

The most relevant means to evaluate if mimicry existed between the burned and unburned remains was to first identify and group the taphonomic mechanisms responsible for producing similar types of colour staining. Sources of similar colour staining were generalized as either light or dark in colour and grouped into three appropriate categories. The first category represented dark staining due to soil interaction or decomposed tissue/fluid. The second category represented light staining due to sun bleaching. The third, and final, category represented light and dark staining due to charring and calcination. Each of the three categories was also assigned a colour tag that would be used in Excel to highlight and identify which Munsell colour readings were associated with each of the three categories (Table 3.1).

Table 3.1 A listing of the three categories used to organize Munsell colour readings including the sources of their staining and their assigned colour tags.

Category	Source of Staining	Assigned Colour Tag
1	Soil Interaction and decomposed /fluids	[redacted]
2	Sun Bleaching	
3	Charred or Calcinated bone	Yellow: light & dark staining

It was important to group the sources of colour staining and colour tag each category for several reasons. Firstly, the analysis of colour mimicry within the scope of this study was purely macroscopic. Therefore, without the help of microscopic analysis or chemical treatment, the specific mechanisms or processes which contributed to staining the surface of the remains would be otherwise difficult to determine or assess. Secondly, grouping and colour tagging each category made it easier to identify overlapping colour readings, regardless of the taphonomic mechanism responsible for producing the colour. Ultimately, these overlapping colours would determine the presence of mimicry. For instance, if the same colour reading was highlighted and tagged in yellow and in blue, that would suggest that mimicry existed between a colour reading of a pig bone that was charred and a pig bone that was stained by soil or decomposed tissue or fluid. Similarly, if the same colour reading was highlighted and tagged in yellow and in green, that would suggest that mimicry existed between a colour reading of a pig bone that was calcinated and a pig bone that was sun bleached.

With the assistance of all photographs taken in the field component of this study and during initial lab analysis, the respective colour tags for Categories 1 to 3 were assigned to the Munsell colour readings for the "control", "advanced" and "skeletonized" pig paired groupings. The carpals, tarsals and phalanges of these three pig paired groupings were not included in the evaluations due to lack of information. Although two colour samples were taken from these excluded groups of bones, there lacked information about how to identify their anatomical order or ensure their orientation in faunal skeletal anatomy reference texts. Furthermore, the current author was not confident to recreate the exact orientation or to identify the specific bone used to source these colour readings. The Munsell colour readings belonging to the "fresh" pig paired grouping were also not included in the evaluation of colour mimicry, against the "control" pig paired grouping. Although they were exposed to the simulated brush fire, thermal injury did not penetrate through the flesh to inflict any heat related skeletal trauma.

The next step in the analysis involved evaluating if mimicry of colour existed between the three categories of colour staining. To ensure that the sources of colour staining for each category remained discrete and separate from one another, only colour readings from category 1 and 2 of the "control" pig paired group were evaluated and scored against the colour readings from category 3 of the "advanced decomposition" and "skeletonization" pig paired group. More specifically, all of the yellow tagged Munsell colour readings from the "advanced decomposition" and "skeletonization" pig paired groupings were compared to the blue and green tagged Munsell colour readings of the "control" pig paired group. Two additional colour tags, red and purple, were created and introduced to assist in this process. The red colour tag was created to identify a Munsell colour reading that overlapped between the dark staining associated with Category 1 and Category 3, while the purple colour tag was created to identify a Munsell colour reading that overlapped between the light staining associated with Category 2 and Category 3 (Table 3.2).

Table 3.2 Lists the two types of overlap of Munsell colour reading between the "advanced decomposition" and "skeletonization" pig paired groupings and the "control" pig paired group.

Sources of Mimicry		
Munsell Colour Readings Sourced from "Advanced Decomposition" and "Skeletonization" pig paired groupings	**Matched with a Munsell Colour Reading Sourced from the "Control" pig paired grouping**	**Newly Assigned Colour Tag**
Category (3): Charred or Calcinated Bone	[redacted]	[redacted]
Category (3): Charred or Calcinated Bone	[redacted]	[redacted]

All yellow tagged Munsell colour readings from both "advanced decomposition" and "skeletonization" pig paired groupings were then individually entered into the "find" tool in Excel and searched against the Munsell colour readings of the "control" pig paired grouping. As each individual yellow tagged colour was searched through the "find" tool, all matching findings were newly assigned with the appropriate red or purple colour tag (Appendix D and Appendix E). The total number of matches made by each individual yellow tagged colour was also tabulated. This served to determine how frequent each Munsell colour reading that was associated with charring or calcination was matched to the colour readings associated with the "control" pig paired grouping.

Once all the Munsell colour readings collected from the burned remains were searched through the "find" tool, the total number of individual, yellow tagged, Munsell colour readings were tabulated. From this select list of colour data, Munsell colour readings were grouped based on: (1) whether or not they made any matches with the "control" pig paired group, (2) whether they assigned a red or a purple colour tag and (3) whether they assigned both red and purple colour tags. Within each of these divided groups, the total number of Munsell colour reading matches made to the "control" pig paired grouping were tabulated so that the frequency of each colour reading match could be determined. The common name for each Munsell colour reading was also denoted.

3.4.2.3. Evaluation of Mimicry in Colour and Surface Texture

To determine the significance of the colour mimicry findings, produced from analyzing the Munsell colour readings collected from the CR-11, a comparative macroscopic evaluation was performed. The experienced eye of Dr. Marnie Wood, a forensic pathologist and Medical Examiner for the Nova Scotia Medical Examiner Service (NSMES), and Dr. Tanya Peckmann, Associate Professor at Saint Mary's University and forensic anthropology consultant for the NSMES, were used to assist in this process. For this macroscopic examination, 50 skeletal elements from the "advanced decomposition", "skeletonization" and "control" pig paired groupings were selected for evaluation. Each skeletal exhibit was marked with one of six coloured adhesive star markers to blind experts to the origin of each bone. Each of the six coloured adhesive stars represented a different pig and its associated burn treatment (Table 3.3).

Table 3.3 Lists the identity of each pig and its associated burn treatment that were decoded by adhesive star markers.

	★	★	★	★	☆	★
Pig #	**1**	**2**	**5**	**6**	**7**	**8**
Burn Treatment Applied	**Control**	**Control**	**Skeletonization**	**Skeletonization**	**Advanced Decomposition**	**Advanced Decomposition**

Experts were asked to determine whether they could tell the difference between skeletal remains which had been exposed to a simulated brush fire versus those which were exposed to the natural environment. Thus, their expertise would confirm through this preliminary evaluation if mimicry of surface colour exists between the surfaces of burned versus natural decomposed remains. To complete this task, each expert was provided a score sheet which identified each skeletal exhibit based on their star marker and the sidedness of each bone (Appendix F). The score sheet also provided a scale of 1 to 5 to evaluate whether or not an exhibit had been exposed to any thermal contact. If experts were not certain of colouration, due to thermal contact or natural decomposition, they had the option to score an exhibit as probable or undetermined. If a skeletal exhibit was scored as "probable", and the score was in favour of the correct source of color staining, experts still received a point for answering correctly. For example, a skeletal exhibit from burn treatment "skeletonization" should be scored 5; however, a score of 4 would also be an acceptable answer.

Chapter 4: Results

4.1. Field Observations of Thermal Alterations at Three Stages of Decomposition

4.1.1. Thermal Alterations to the "Fresh" pig pair

Similar thermal injuries were identified on the "fresh" pig paired group, pigs #3 and #4. The survivorship of flesh and bone was characterized by minimal charring to the body with the internal organs intact, blistering of the epidermis, and singeing of body hair (Figures 4.1 to 4.10). According to published fire modification thermal systems, these injuries were classified as CGS level #1 of thermal destruction (Crow and Glassman 1996). Blistering of the epidermis was primarily found on the anterior surface of the snout and on the ventral surface of the head and trunk of both pigs. Singeing of body hair and mild charring of the body was observed primarily around the perimeters of each pig.

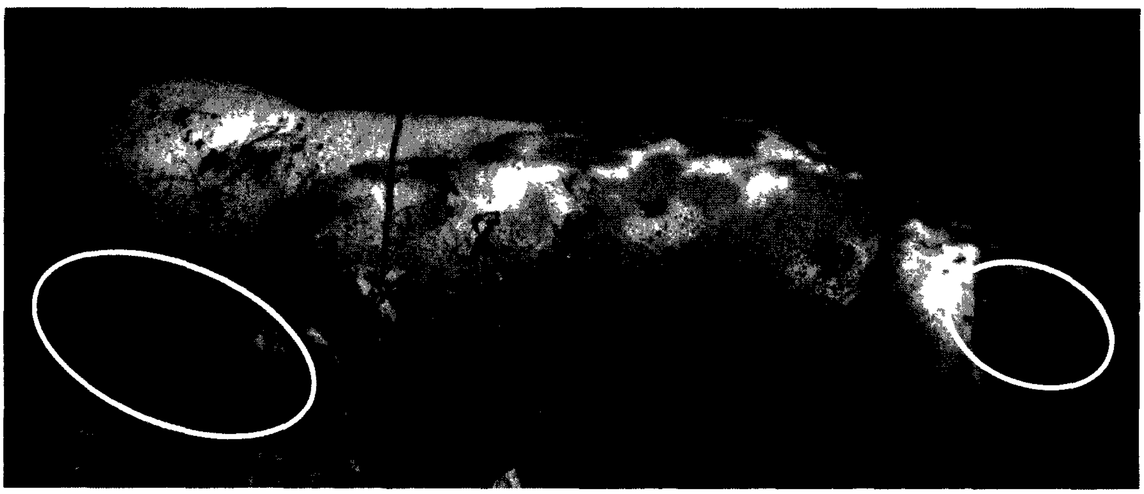

Figure 4.1 This mid-range image illustrates mild charring (yellow circles) and singeing of body hair on the dorsal surface of pig #4.

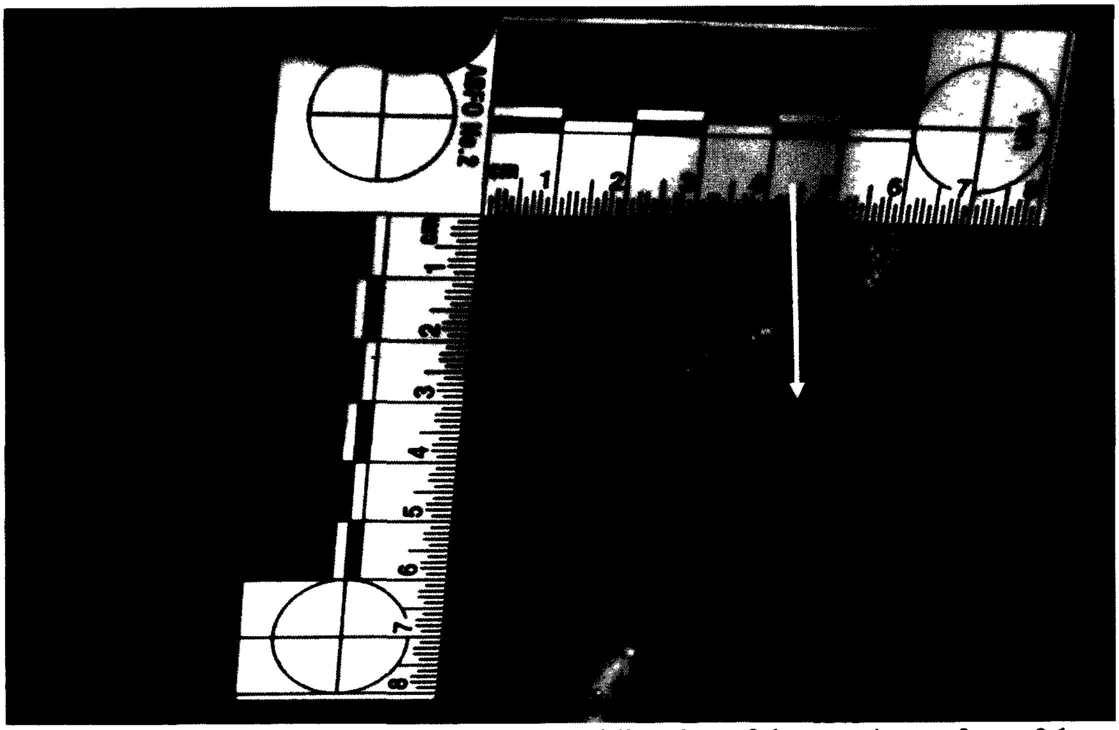

Figure 4.2 This close-up image highlights the blistering of the anterior surface of the snout of pig #4 (yellow arrow).

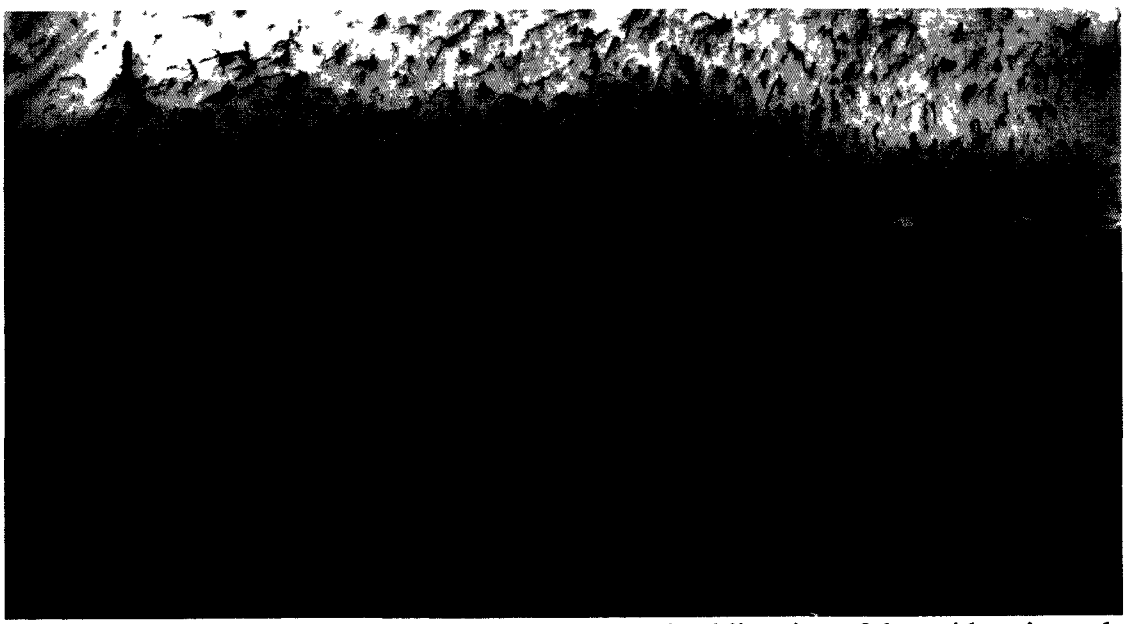

Figure 4.3 This mid-range image depicts the extensive blistering of the epidermis on the ventral surface of the trunk of pig #4.

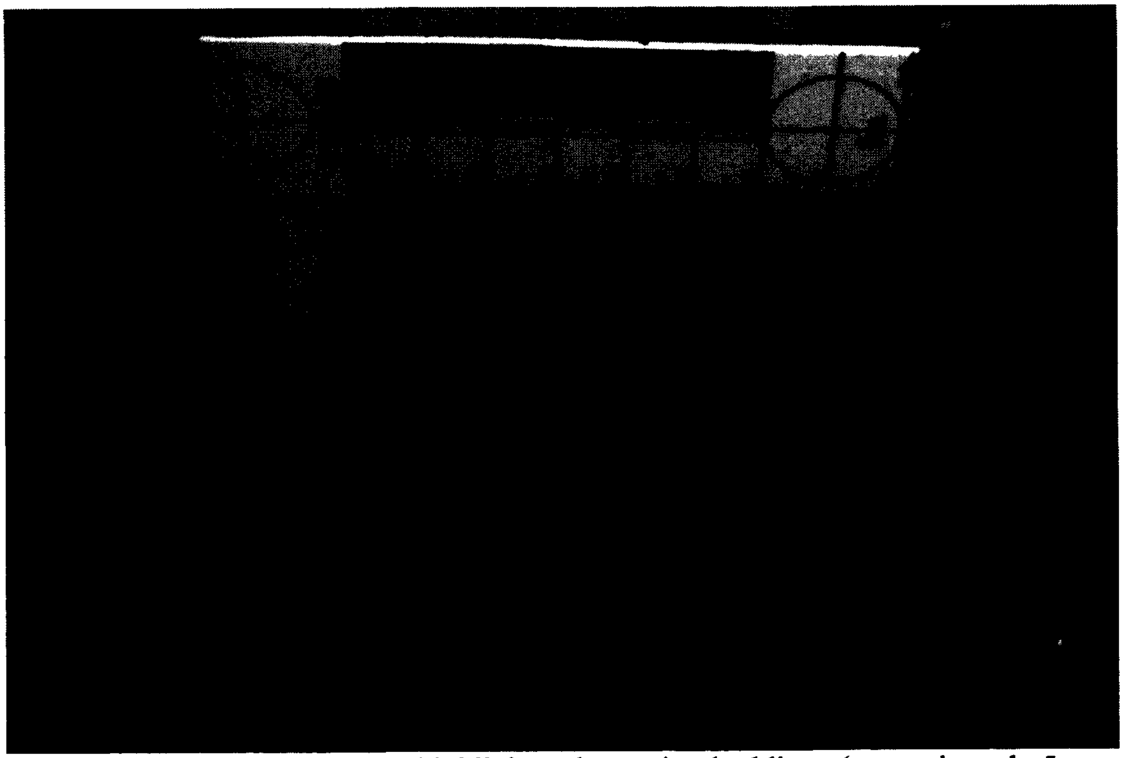

Figure 4.4 This close-up image highlights a large circular blister (approximately 5 cm long by 2 cm wide) that manifested on the ventral surface of the trunk of pig #4.

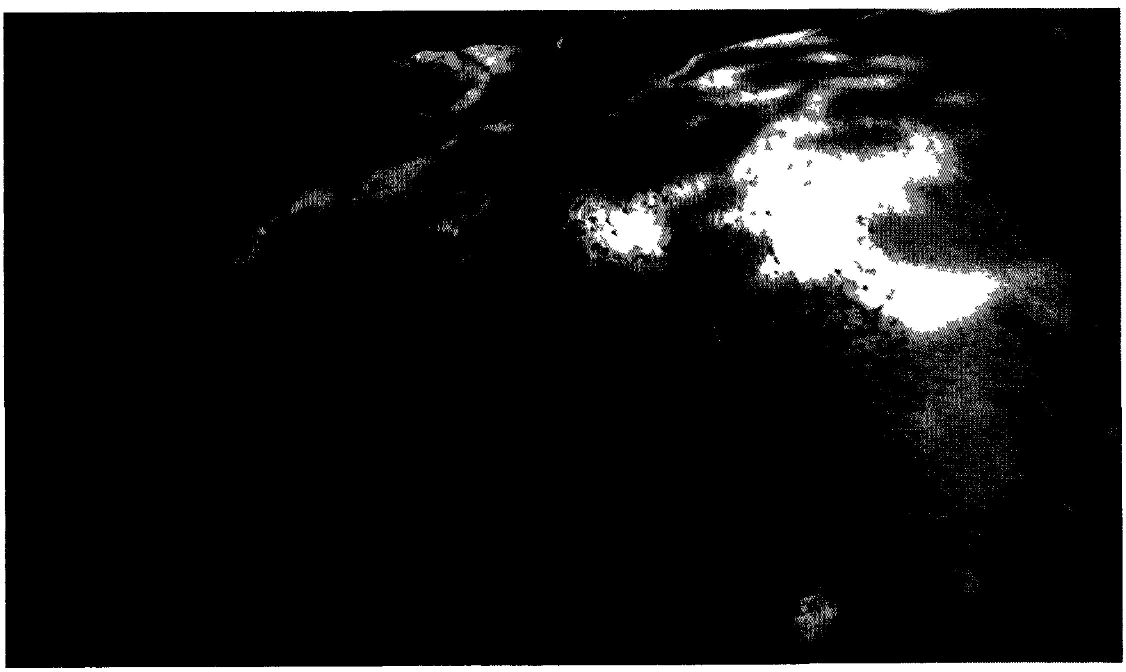

Figure 4.5 This mid-range image depicts the blistering of the epidermis and the extension of singed hair on the ventral surface of the head and neck region of pig #4.

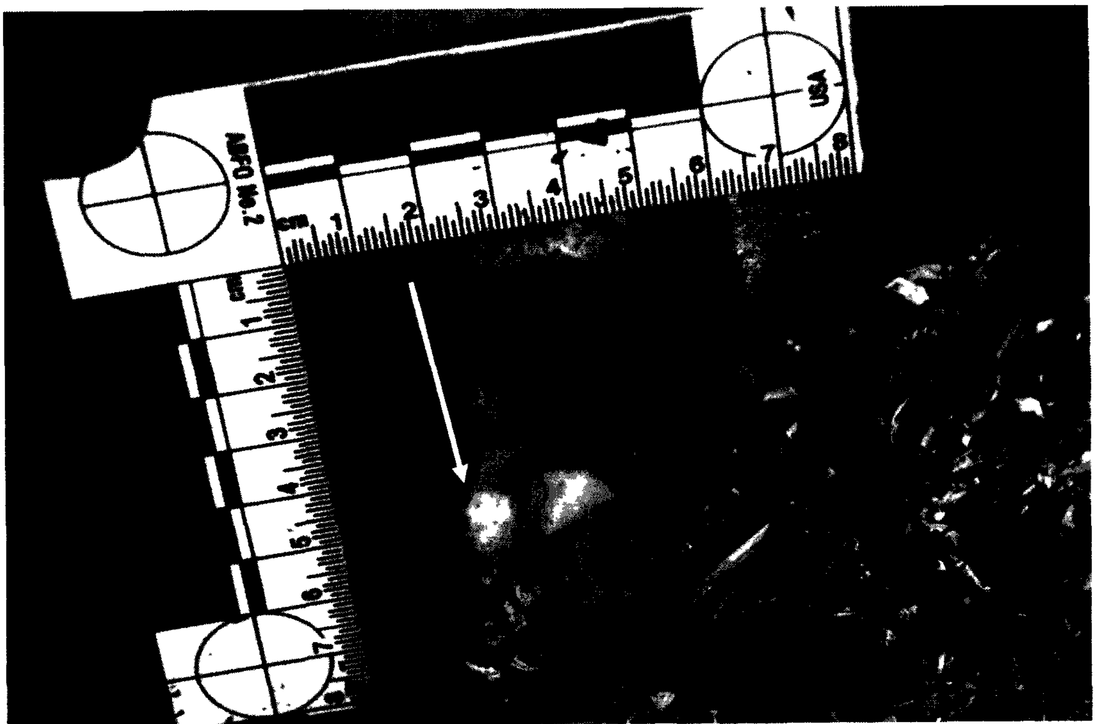

Figure 4.6 This close-up image highlights the blistering of the anterior surface of the snout of pig #3 (yellow arrow). Similar blistering of the anterior surface of the snout is also found on pig #4.

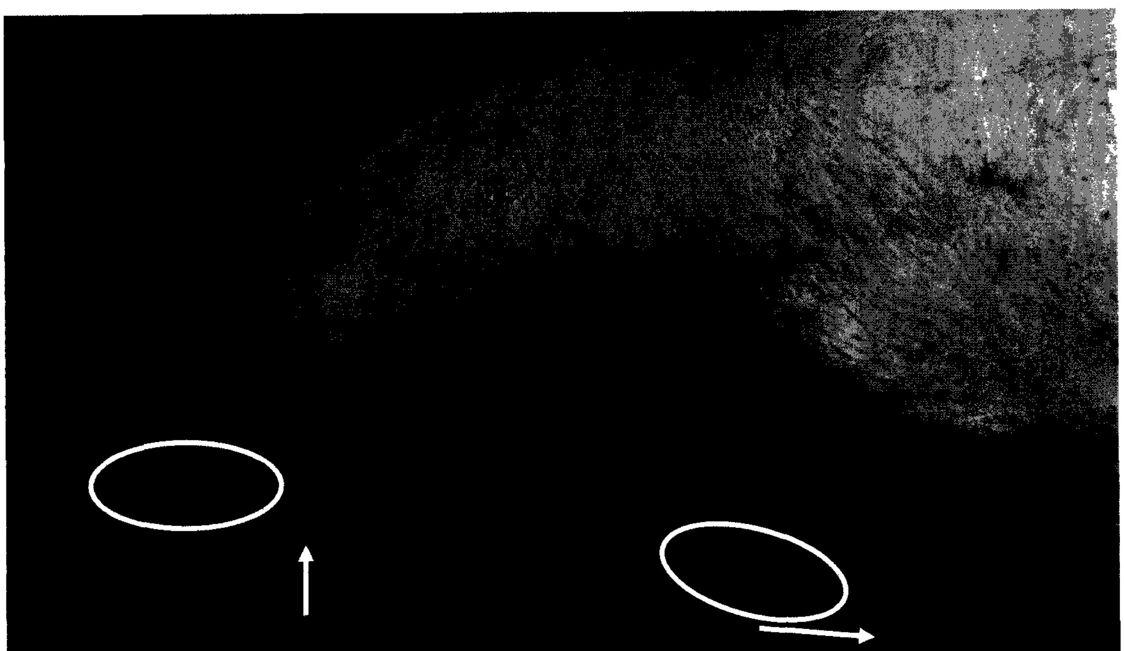

Figure 4.7 This mid-range image depicts mild charring (yellow arrows), singeing of hair, and blistering of the epidermis (yellow circles) on the ventral surface of the head and neck region of pig #3. Similar thermal injuries are observed on pig #4.

Figure 4.8 This mid-range image presents the mild charring on the right lateral surface of the hind limb of pig #3 (yellow circle) and extensive singeing of body hair.

Figure 4.9 This mid-range image provides evidence that the fire moved around pig#3, from the ventral to the dorsal surface, yet, it did not have any effect on the left lateral surface. Mild charring and singeing of body hair is also consistent around the body of pig #3.

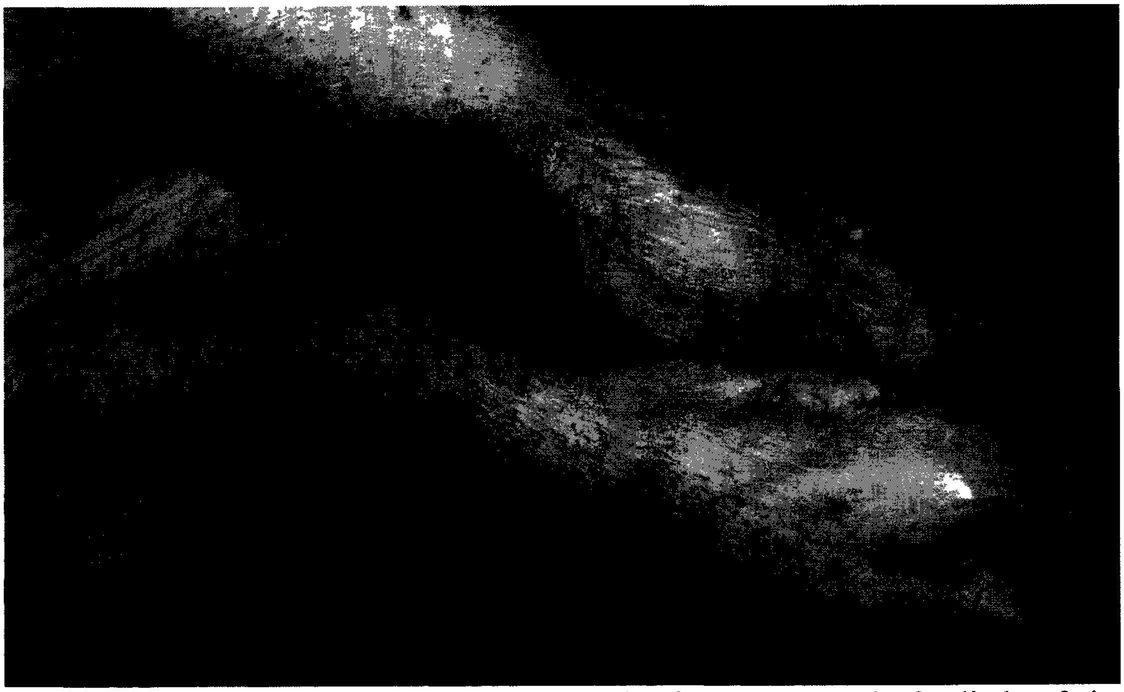

Figure 4.10 This mid-range image shows mild charring present on the forelimbs of pig #3.

4.1.2. Thermal Alterations to the "Skeletonization" pig pair

The most intense thermal damage was experienced by the "skeletonization" pig pair, pigs #5 and #6. This was directly correlated to the minimal amounts of insolating flesh present to protect the surface of the bone from the thermal damage. Initial observations of pig #5 revealed charring and calcination of the right gonial angle of the mandible; charring and calcination on the ventral-lateral aspect of the left ribs; heavy degree of charring and calcination on the pelvic girdle; and heavy charring on the proximal aspect the hind limbs. The majority of charring in the hind limbs, of pig #5, occurred mainly on the epiphyses of the long bones with no charring present on the long bone shafts (Figures 4.11 to 4.16).

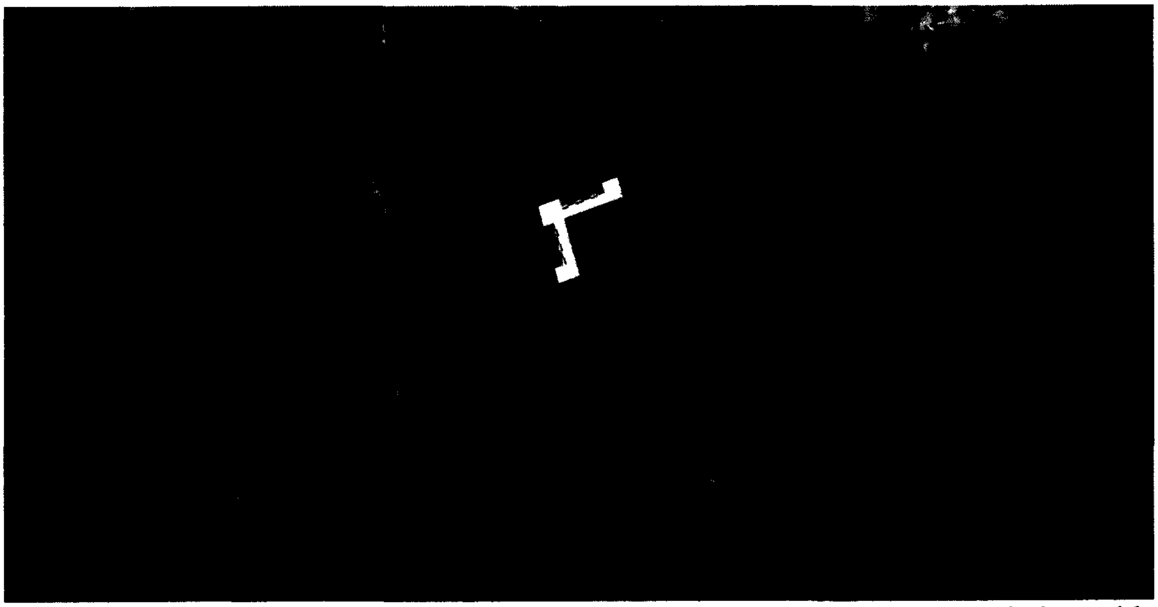

Figure 4.11 An overall image of pig #5 post-burn treatment (left lateral-ventral view with the head region on the right side of the image).

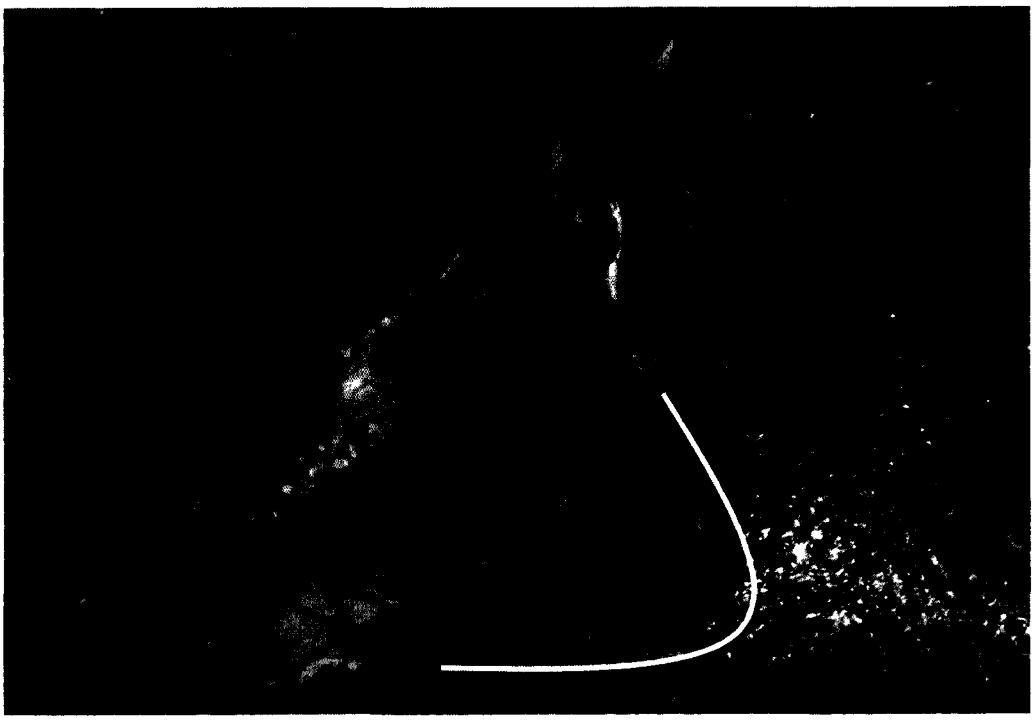

Figure 4.12 A mid-range image of the head and neck region of pig #5 (left lateral view). Note the charring and calcination present on the medial aspect of the gonial angle on the mandible (yellow arc).

Figure 4.13 A mid-range image of the forelimbs and a portion of the ribcage of pig #5. All skeletal elements are protected from thermal damage due to desiccated flesh and decomposed tissue fluid present (left lateral view).

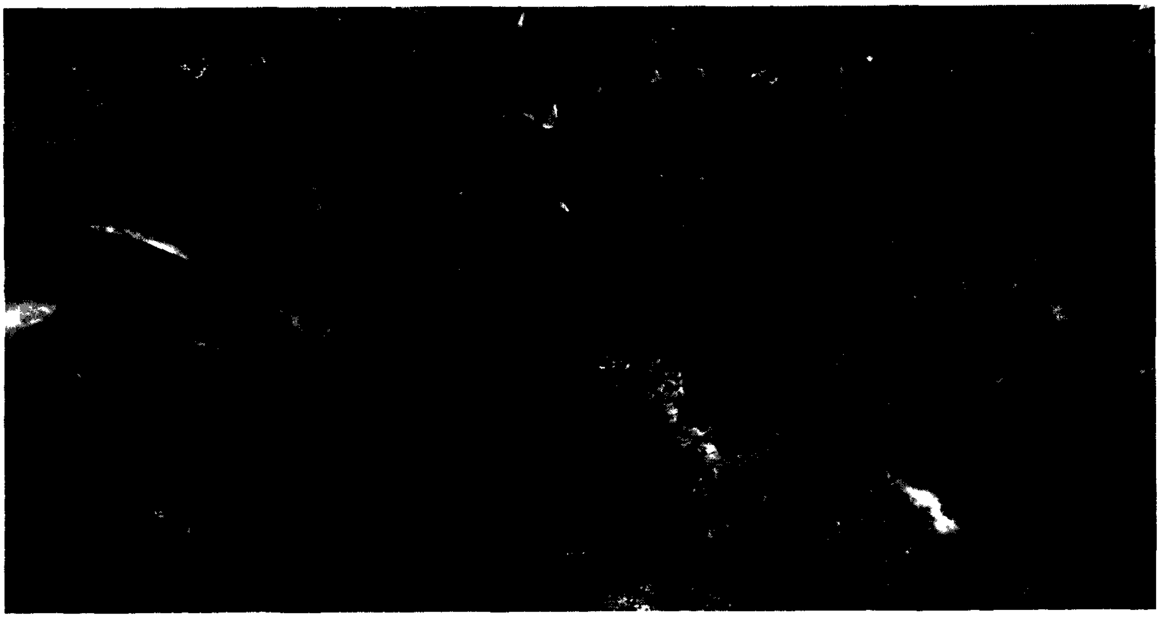

Figure 4.14 A mid-range image of the thermal damage to the ribcage, vertebral column, and pelvic girdle of pig #5 (left lateral-ventral view).

Figure 4.15 A mid-range image of the thermal destruction present in the lumbar vertebrae, pelvic girdle, and the proximal aspects of the hind limbs of pig #5 (ventral view of pelvic girdle).

Figure 4.16 A mid-range image of the thermal damage present on the right hind limb of pig #5 (medial view).

Post-burn treatment observations of pig #6 have showed extensive charring and calcination of more than fifty percent of the body. Very small amounts of pyrolized flesh remained on the cadaver, which produced full exposure of the skeletal elements of pig #6. There was also extensive charring on the head with damage on the left nasal bone, the left maxilla bone, and the gonial angle of the mandible. The most extensive charring and calcination were present on the cervical vertebrae, thoracic vertebrae, and the ribcage with shades of black, blue, and grey bone present in this region. Due to the sequence of disarticulation of pig #6, the right medial aspect of the ribs were protected under the thoracic vertebrae and the left ribs. As a result, the left lateral aspect of the ribcage was exposed to extensive charring and calcination while the medial aspects of the costal ends of the right ribs were protected. Lastly, there was a mild degree of charring present on the posterior aspect of the pelvic girdle and hind limb region (Figures 4.17 to 4.23).

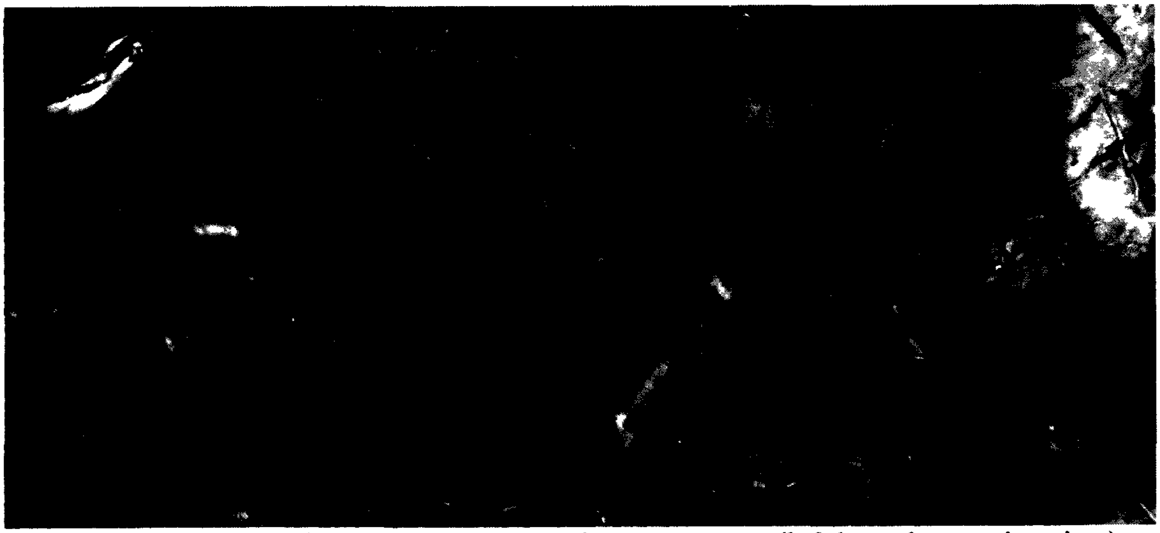

Figure 4.17 An overall image of pig #6 post-burn treatment (left lateral-posterior view).

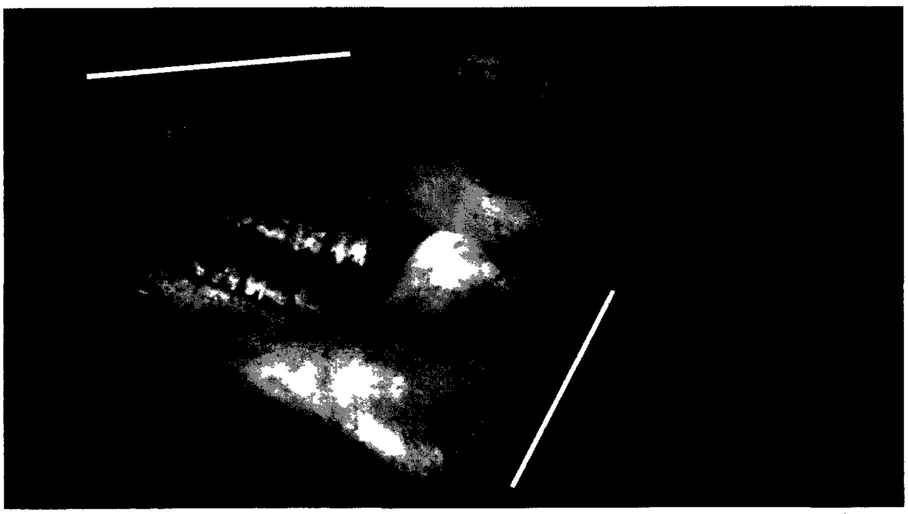

Figure 4.18 A close-up image of the thermal damage present on the head and neck region of pig #5 (left lateral view). Note the charring present on the left nasal bone, the left maxilla bone, and the gonial angle of the mandible (yellow lines).

Figure 4.19 A mid-range image of the thermal damage present on the forelimbs of pig #5 (left lateral view). Note that the charring present within this region is confined to the unions of the epiphyses and metaphyses.

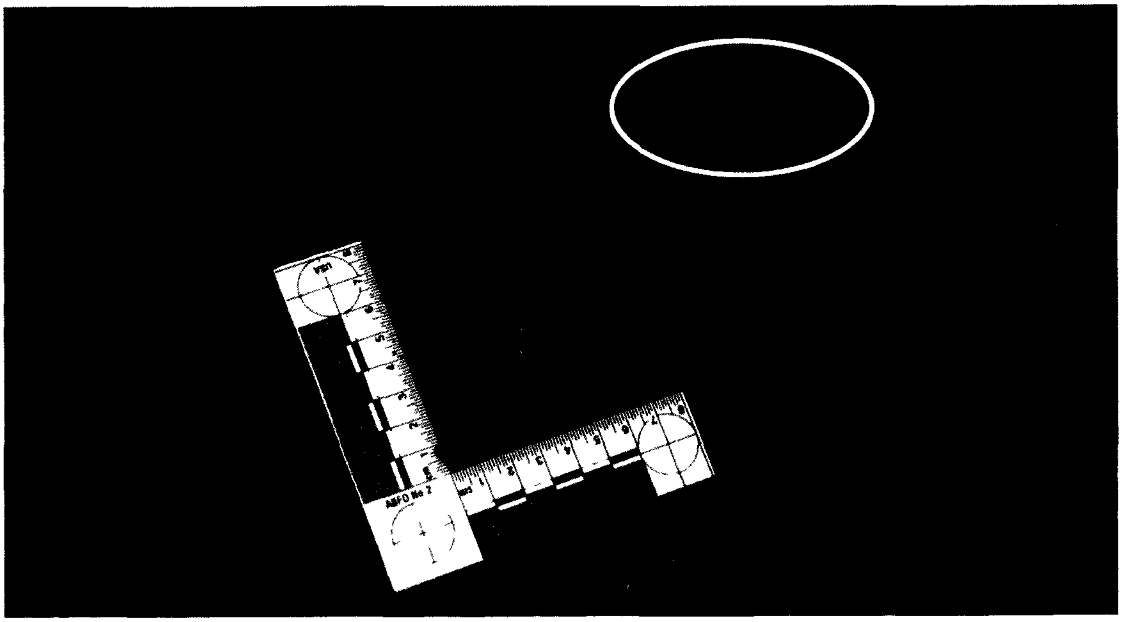

Figure 4.20 A mid-range view of the extensive thermal damage present on the trunk of pig #5. This is evident through varying degrees of charred and calcinated bone (left lateral view). Note the costal aspect of the right upper ribs remained undamaged (yellow circle).

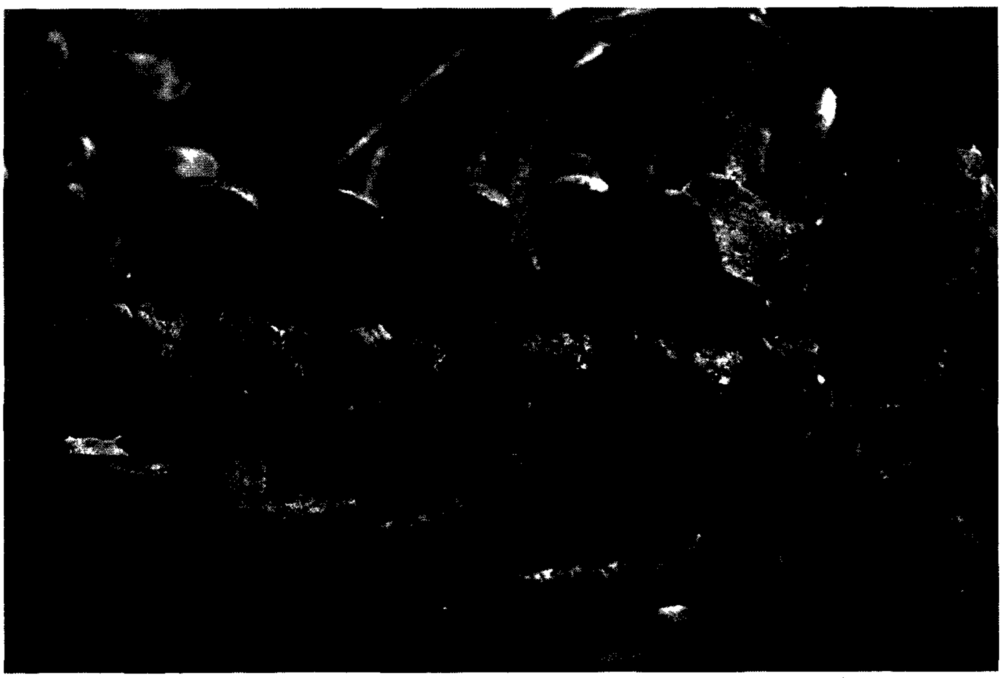

Figure 4.21 A close-up image of the thermal damage present on the trunk region of pig #5 (dorsal view of the area of articulation between the ribs and the thoracic vertebrae). Note the varying degrees of charred, calcinated, and unburned bone present.

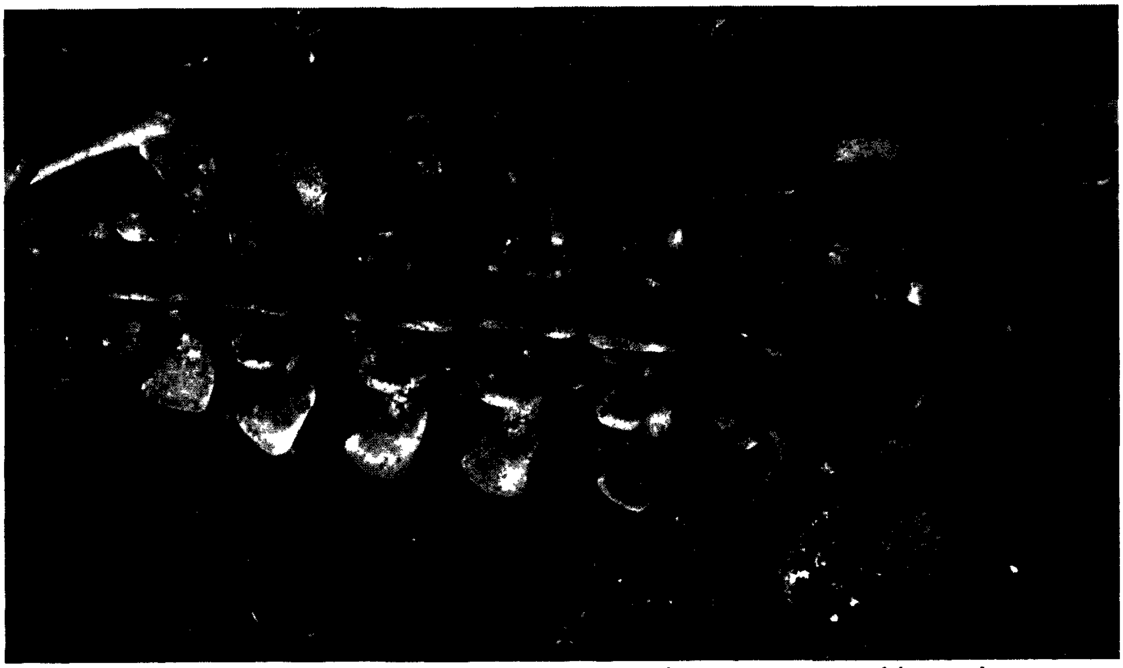

Figure 4.22 A mid-range image of the lumbar vertebrae, sacrum, and innominate bones (posterior view). Note the varying degrees of charred, calcinated and unburned bone present.

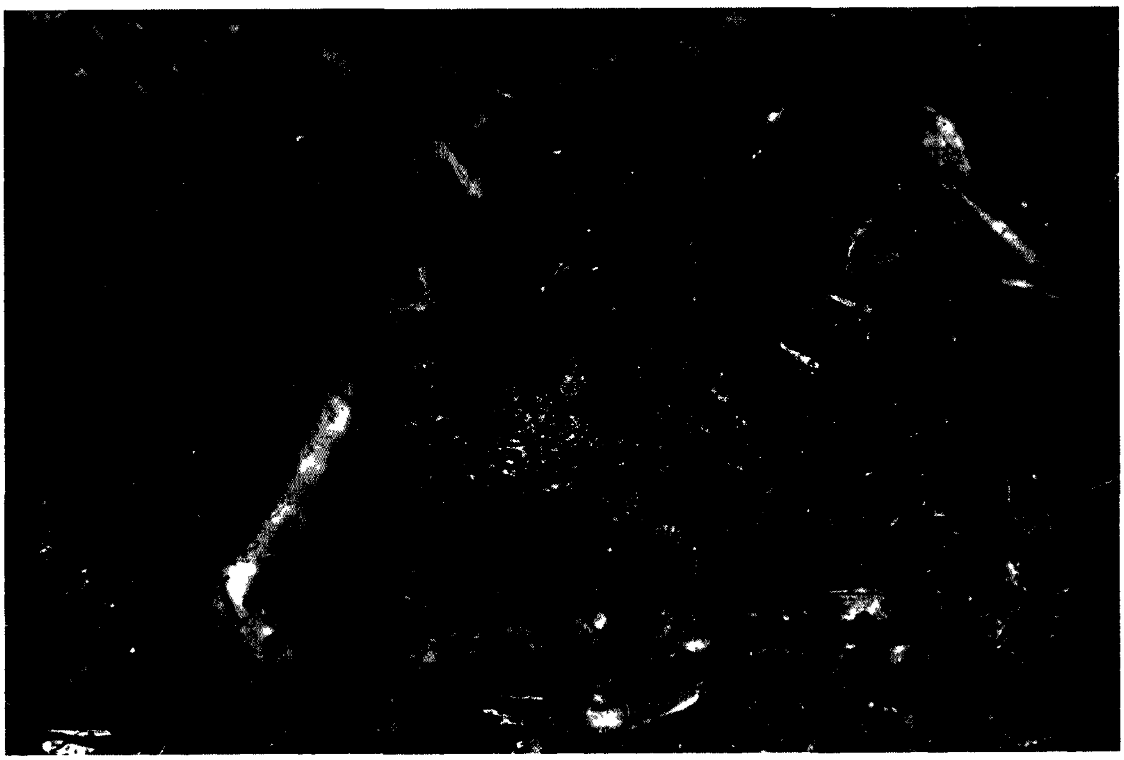

Figure 4.23 A mid-range image of the thermal damage that was present on the posterior aspect of the trunk and hind limb region of pig #5.

4.1.3. Thermal Alterations to the "Advanced Decomposition" pig pair

Field observations revealed that the decomposed and mummified flesh of pigs #7 and #8 received the most thermal damage. There was minimal destruction to the surface of the skeletal remains. The burn treatment of pig #7 resulted in the removal of mummified flesh from the head; the flesh in the neck and trunk region was breached and there was minimal charring on the limbs. The thermal damage in the neck and trunk region breached the flesh to reveal more of the scapula, ribcage, and thoracic vertebrae. Much of the ventral aspect posterior to the trunk region was also revealed by the thermal damage with charring present on the left iliac crest of the innominate bone (Figures 4.24 to 4.29).

Figure 4.24 An overall image of pig #7 post-burn treatment (left lateral view).

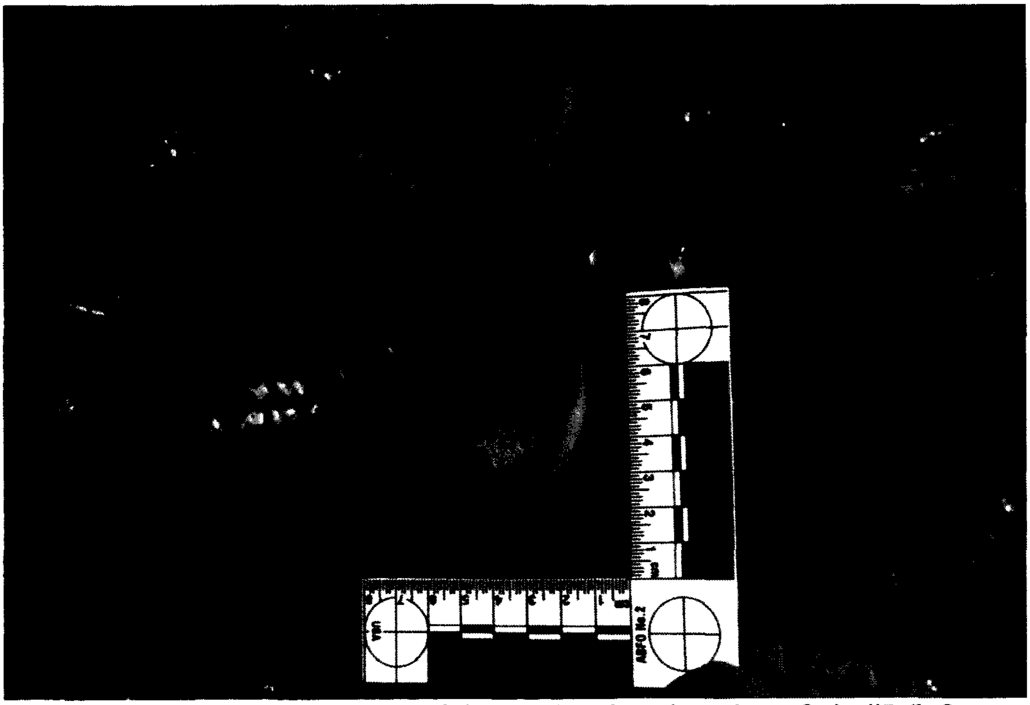

Figure 4.25 A mid-range image of the head and neck region of pig #7 (left lateral view). Note the mummified flesh on the head has been removed due to the burn treatment.

Figure 4.26 A mid-range image of the neck, anterior aspect of the trunk, and forelimb regions of pig #7 (left lateral view). The thermal damage has breached the neck and trunk to reveal more of the left scapula, thoracic vertebrae (yellow circle), and the ribs.

Figure 4.27 A mid-range view of the trunk of pig #7 (left lateral view). Thermal damage has breached the trunk flesh to reveal the spinal column, ribs, and the pelvic girdle.

Figure 4.28 A mid-range image of the posterior aspect of the trunk region of pig #7 (left lateral view). Note that there was minimal charring experienced by the hind limbs and pelvic girdle (yellow arrows).

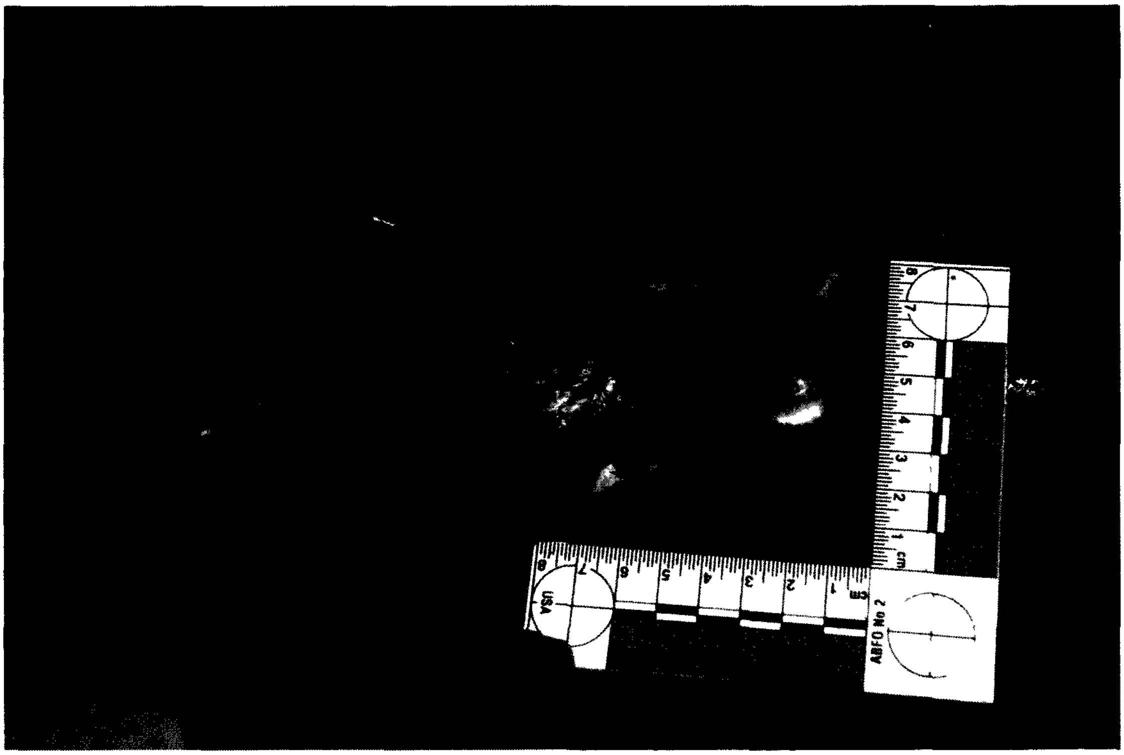

Figure 4.29 A close-up image of the left hind limb of pig #7 (lateral view). Minimal amount of thermal damage is present on the bone.

Post-burn treatment observations of pig #8 revealed extensive charring and calcination to the posterior aspect of the head and right hind limb, with minimal degrees of charring present on the thoracic vertebrae. Shades of blue, grey, black and white bone were seen in the posterior aspect of the head and commingled with pyrolized flesh. Flesh around the posterior aspect of the trunk was breached to reveal the thoracic vertebrae and the costal aspect of two ribs. Minimal amount of charring was present on the transverse processes of three vertebrae. The forelimbs were protected under mummified and desiccated flesh, although the left humerus was revealed when flesh around the neck region was breached by the fire. Charred and calcinated bone was observed on the distal aspect of the right hind limb as it was the second last area of pig #8 to self-extinguish (Figures 4.30 to 4.38).

Figure 4.30 An overall image of pig #8 post-burn treatment (left lateral view).

Figure 4.31 A mid-range image of the head and neck region of pig #8. Note the varying degrees of charred and calcinated bone present on the posterior aspect of the head (yellow circle).

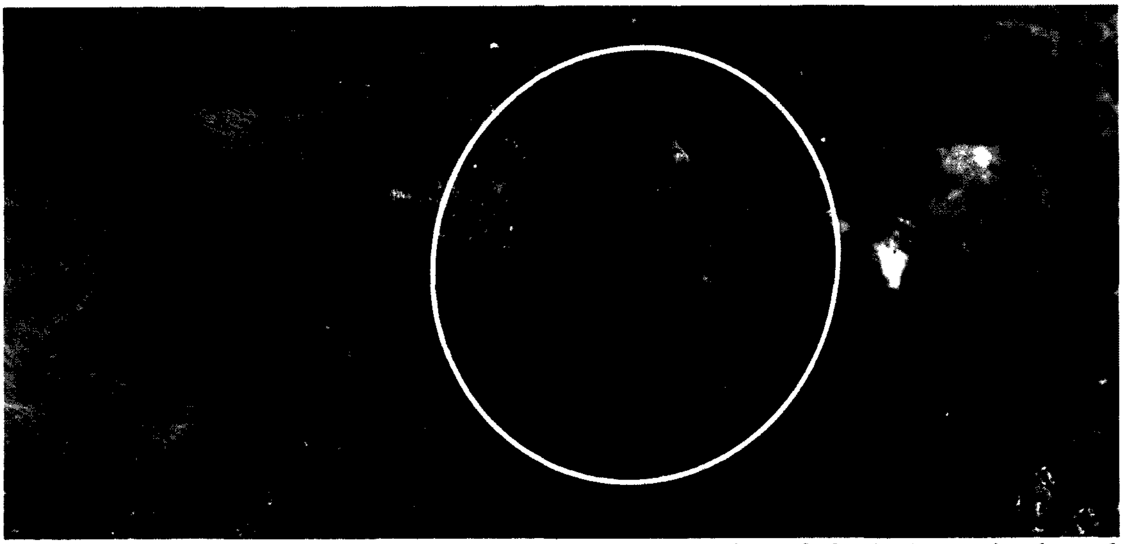

Figure 4.32 A mid-range image of the head and neck region of pig #8 (posterior-lateral view). Note the heavy degree of charred and calcinated bone present on the posterior aspect of the head (yellow circle).

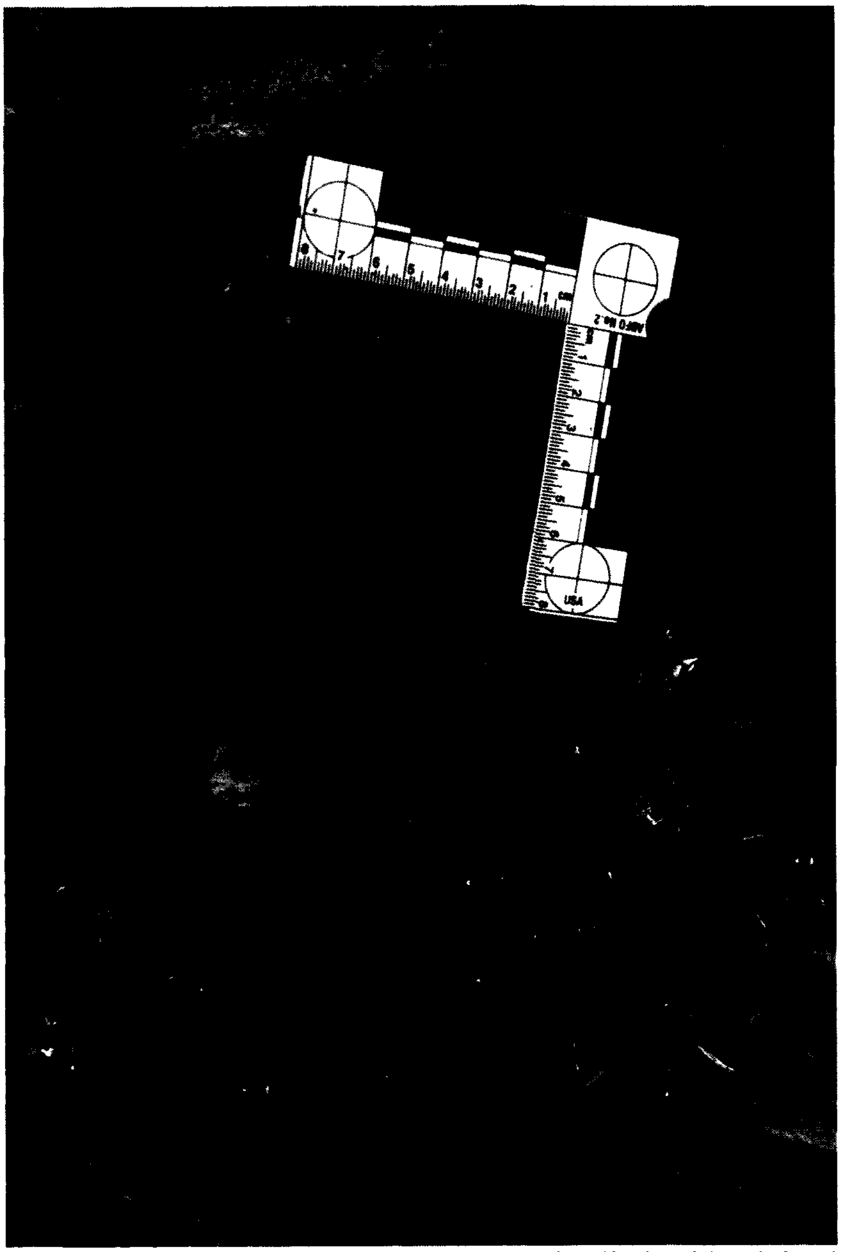

Figure 4.33 A close-up image of the right forelimb with minimal thermal damage present on pig #8 (medial view).

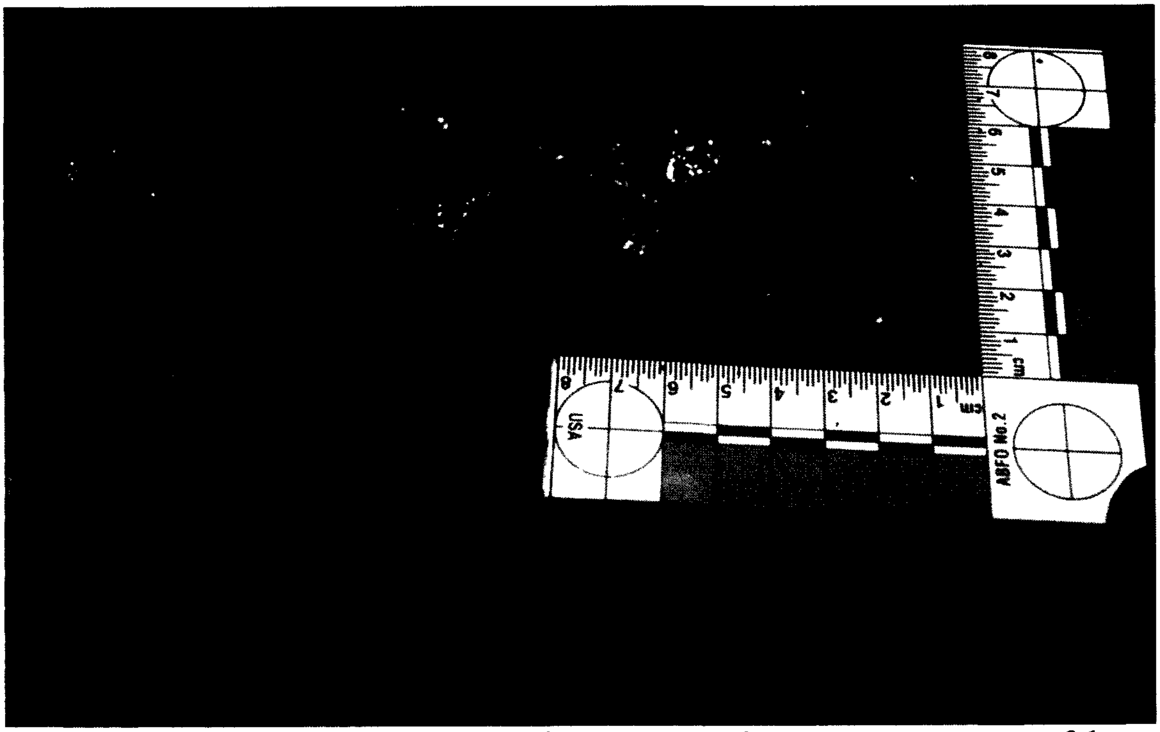

Figure 4.34 A close-up image of the charring present on the transverse processes of three vertebrae (ventral view). Note the singed hair present on the trunk of pig #8.

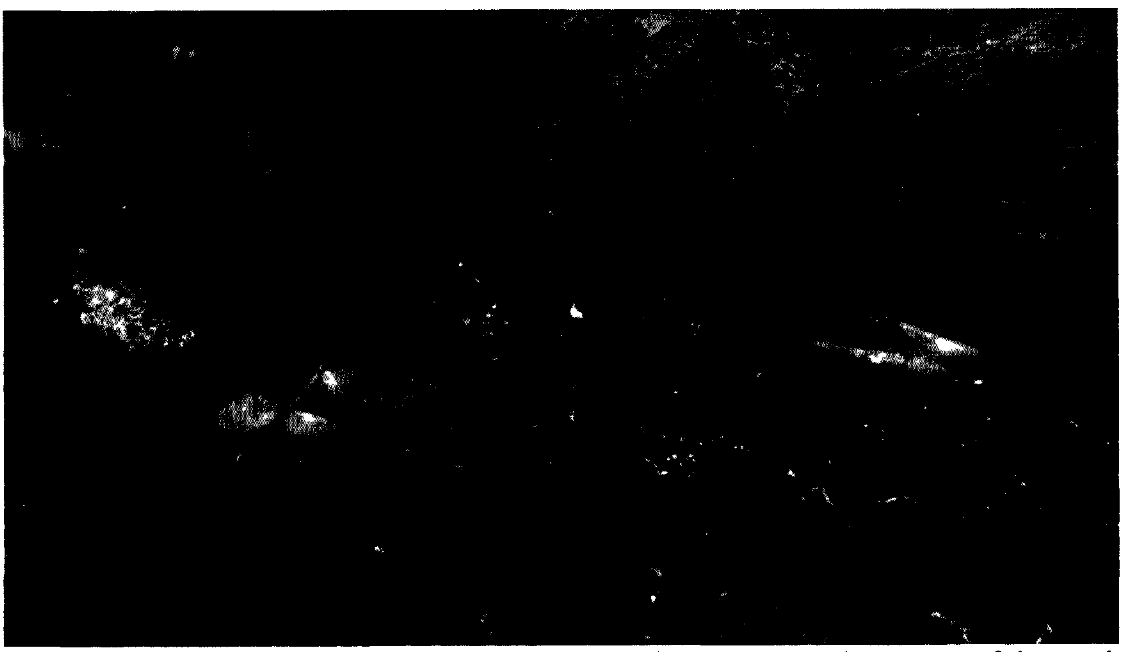

Figure 4.35 A mid-range view of the breached flesh on the posterior aspect of the trunk of pig #8. Note the decomposed tissues and fluids which once protected the ribs and vertebrae from thermal damage.

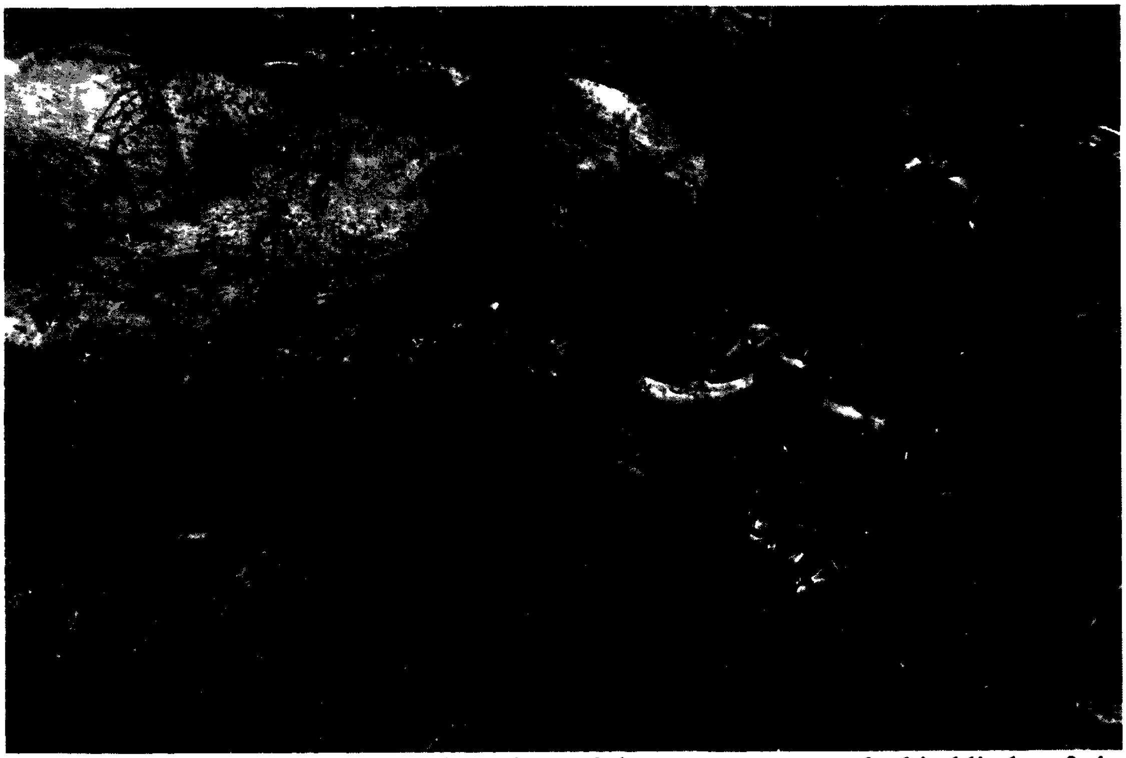

Figure 4.36 A mid-range image of the thermal damage present on the hind limbs of pig #8 (left lateral view).

Figure 4.37 A close-up image of the right hind limb of pig #8 (posterior view). Note the heavy amount of charred and calcinated bone present.

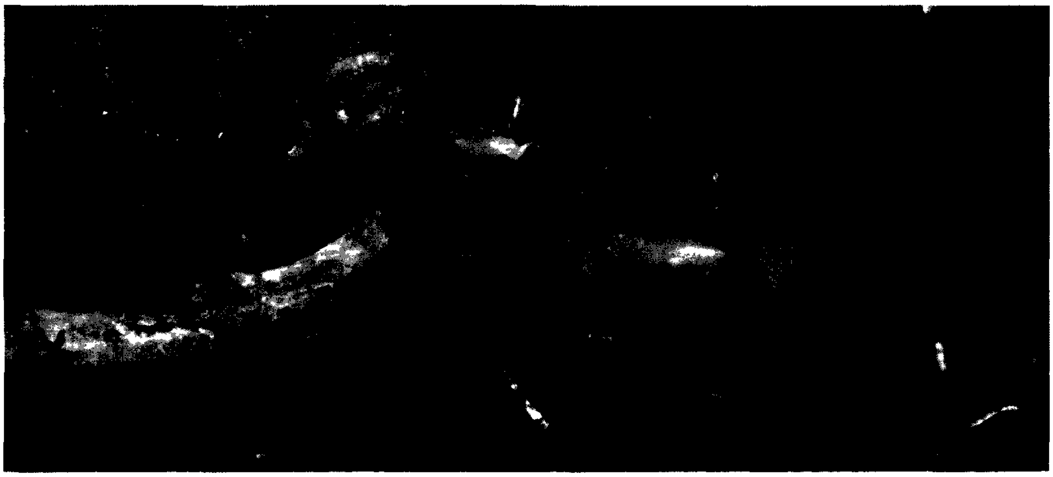

Figure 4.38 A close-up image of the minimal amount of thermal damage present on the left hind limb of pig #8 (lateral view).

4.2. A Final Evaluation of Decomposition Prior to Removal from Field

4.2.1. Attainment of a Minimum of 1285 ADD +/- 110 ADD

The decomposition of all eight pigs was consistently documented until a final ADD value of 1513 was achieved on 25 August 2009. As suggested by the methodology of Vass et al. (1992), a minimum of 1285 ADD +/- 110 ADD must be achieved in order to allow the majority of all accessible muscles and fats to degrade and for remains to reach skeletonization. In this project, a minimum of 1179 ADD was achieved by 9 August 2009 and a maximum of 1391 ADD was achieved on 19 August 2009 to satisfy the methodology by Vass et al. (1992). The suggested value of 1293 ADD was achieved on 15 Aug 2009. Although there was a high degree of skeletonization evident in seven of the eight pigs, large amounts of decomposed tissues and fats were still commingled with the skeletal remains. The final Total Body Score, for all eight pigs, on 25 August 2009 are listed in Table 4.1. According to the methodology by Megyesi et. al. (2005), a total body score between 27 and 35 points must be achieved for remains to be considered skeletonized. As illustrated in Table 4.2, all eight pigs achieved a Total Body Score within this point range (Figures 4.39 to 4.46).

Table 4.1 Final Total Body Score for all eight pigs as recorded on 25 August 2009.

Pig#	Head and neck Score	Trunk Score	Limbs Score	Total Body Score
1	11	10	7	28
2	11	10	9	30
3	11	10	8	29
4	11	8	8	27
5	13	10	9	29
6	13	12	10	29
7	12	9	8	32
8	12	9	8	35

Figure 4.39 An overall image of pig #1, burn treatment type: Control, from 25 August 2009 (left lateral view).

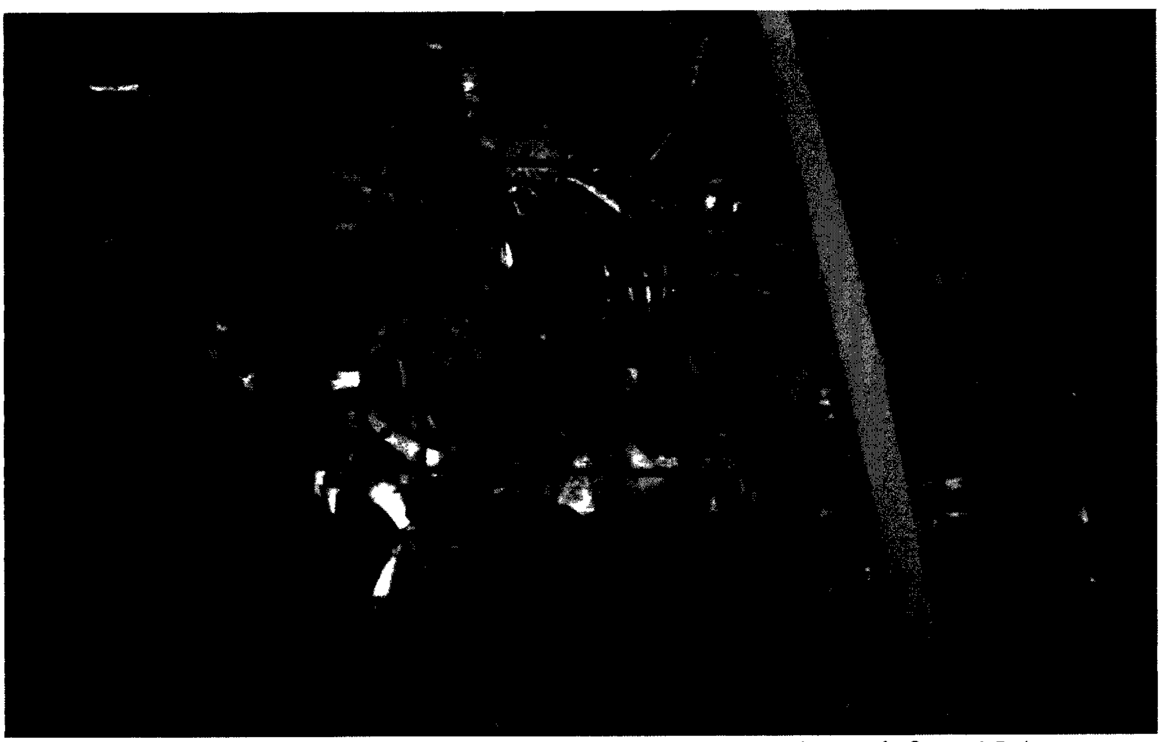

Figure 4.40 An overall image of pig #2, burn treatment type: Control, from 25 August 2009 (left lateral view).

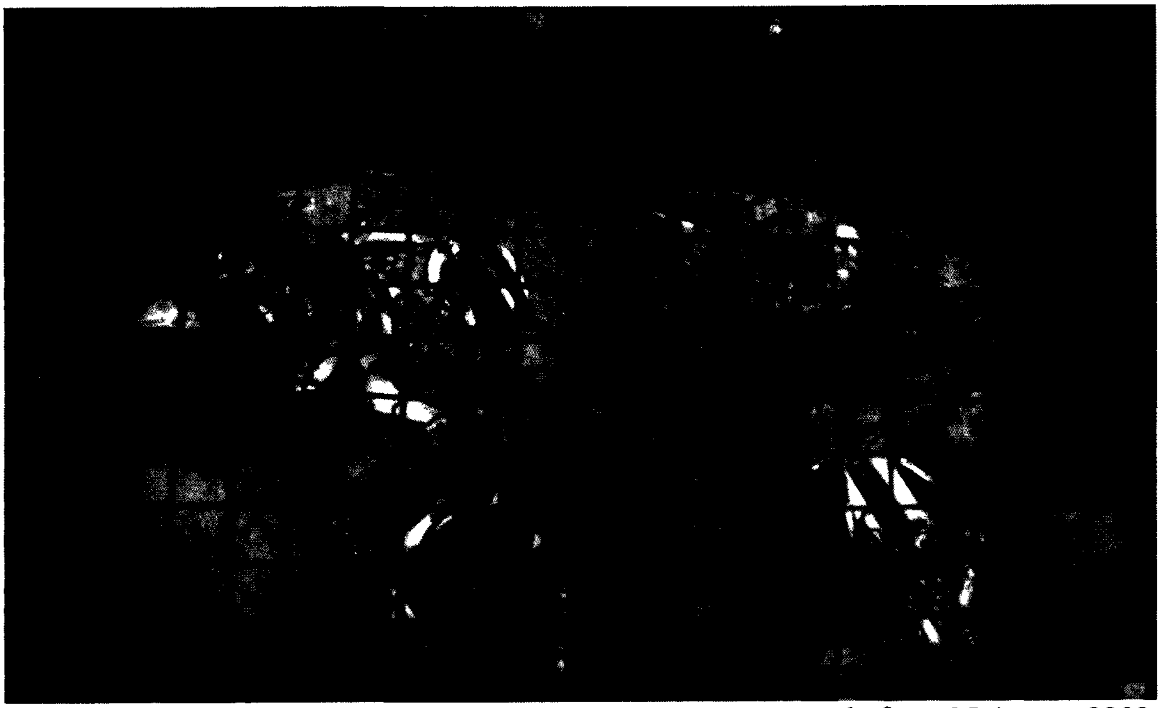

Figure 4.41 An overall image of pig #3, burn treatment type: Fresh, from 25 August 2009 (left lateral view).

Figure 4.42 An overall image of pig #4, burn treatment type: Fresh, from 25 August 2009 (left lateral view).


Figure 4.43 An overall image of pig #5, burn treatment: Skeletonization, from 25 August 2009 (left lateral view).


Figure 4.44 An overall image of pig #6, burn treatment type: Skeletonization, from 25 August 2009 (left lateral view).

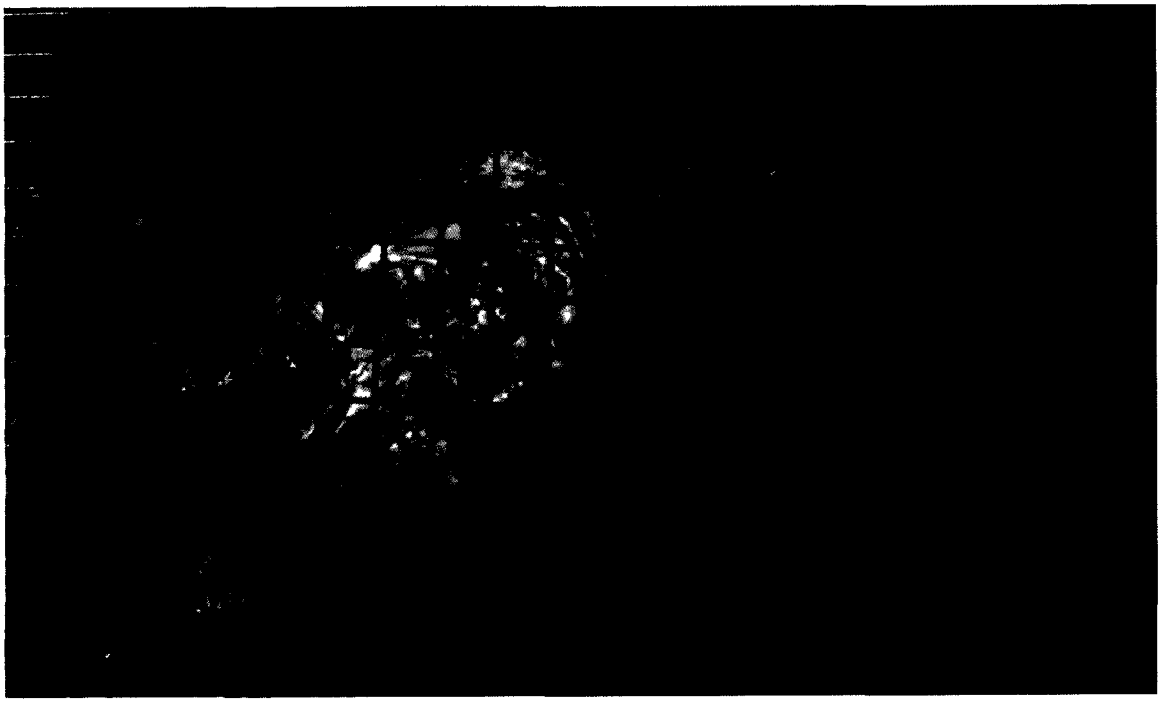
Figure 4.45 An overall image of pig #7, burn treatment type: advanced decomposition, from 25 August 2009 (left lateral view).


Figure 4.46 An overall image of pig #8, burn treatment type: advanced decomposition, from 25 August 2009 (left lateral view).

4.3. Burn Pattern Signatures

4.3.1. Assessment of Burn Pattern Signatures in "Fresh" Pig Pair

Since the thermal injuries, as noted in the field, were limited to mild charring and blistering of the epidermis and singeing of the body hair, no heat-related skeletal traumas were evident on the surface of the bone. Therefore, there was no burn pattern on the "freshly" decomposed remains. All discolouration patterns present on the surface of the pigs #3 and #4 were attributed to soil interaction, contact with decomposing tissues and fluids, and sun bleaching (Figures 4.47 to 4.52). Similar discolouration patterns were observed on the control pig pair, pigs #1 and #2 (Figure 4.53 to 4.58).

Figure 4.47 A mid-range image, of the skeletal remains of pig #3, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of cranial region of pig #3).

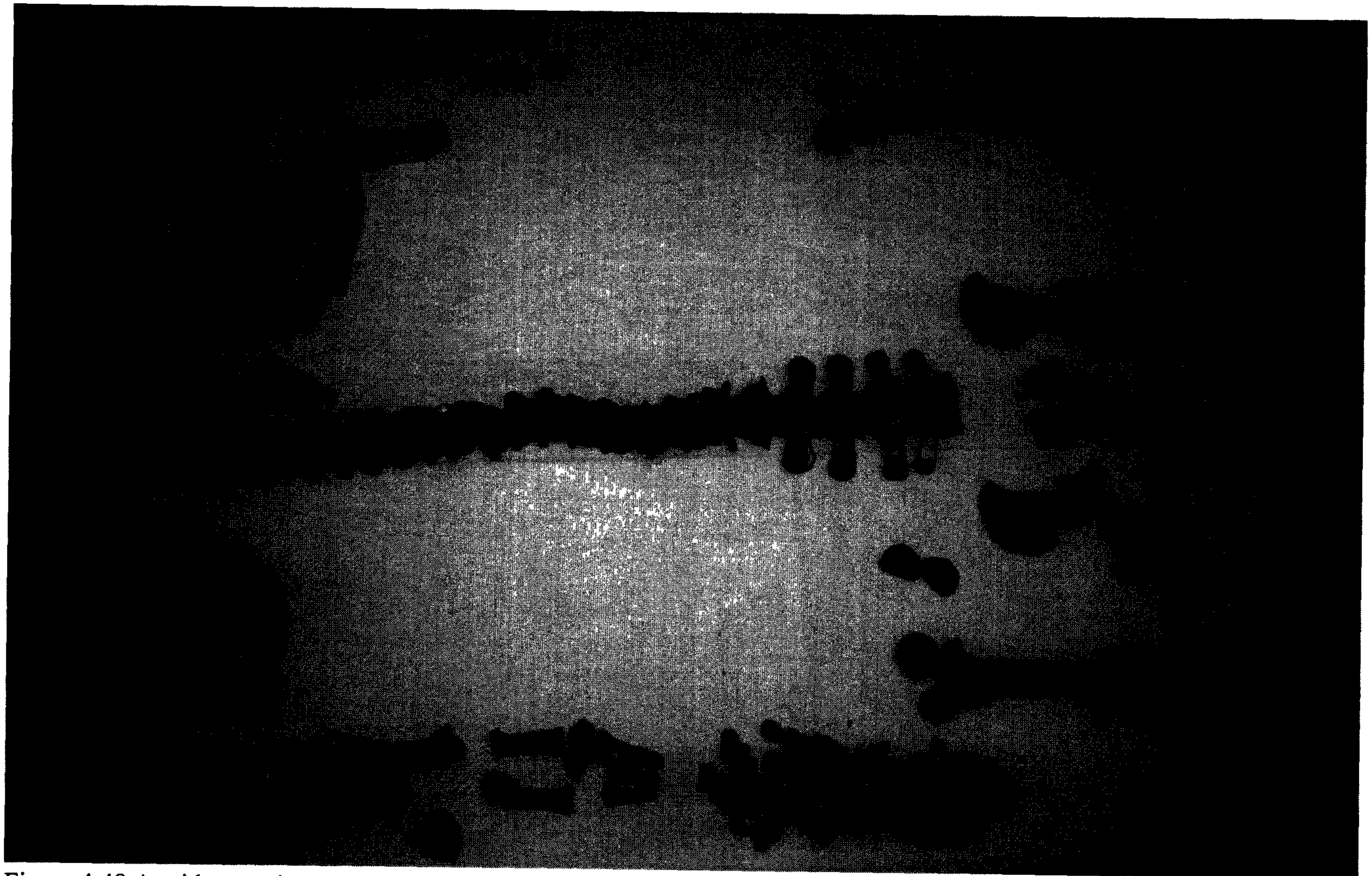

Figure 4.48 A mid-range image, of the skeletal remains of pig #3, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of trunk region of pig #3).

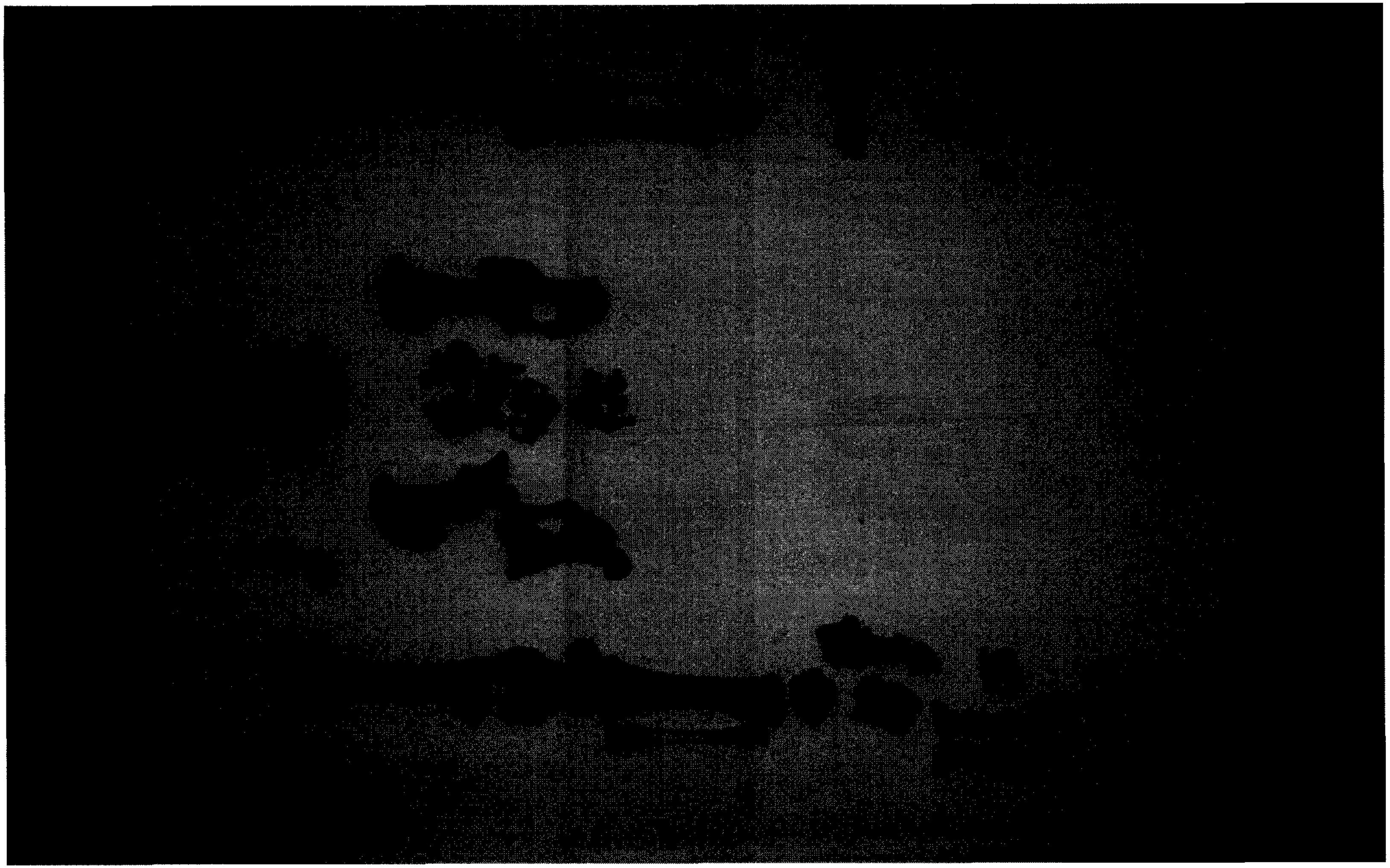

Figure 4.49 A mid-range image, of the skeletal remains of pig #3, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of caudal region of pig #3).

Figure 4.50 A mid-range, of the skeletal remains of pig #4, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of cranial region of pig #4).

Figure 4.51 A mid-range image, of the skeletal remains of pig #4, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of trunk region of pig #4).

Figure 4.52 A mid-range image, of the skeletal remains of pig #4, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of caudal region of pig #4).

Figure 4.53 A mid-range image, of the skeletal remains of pig #1, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of cranial region of Pig #1).

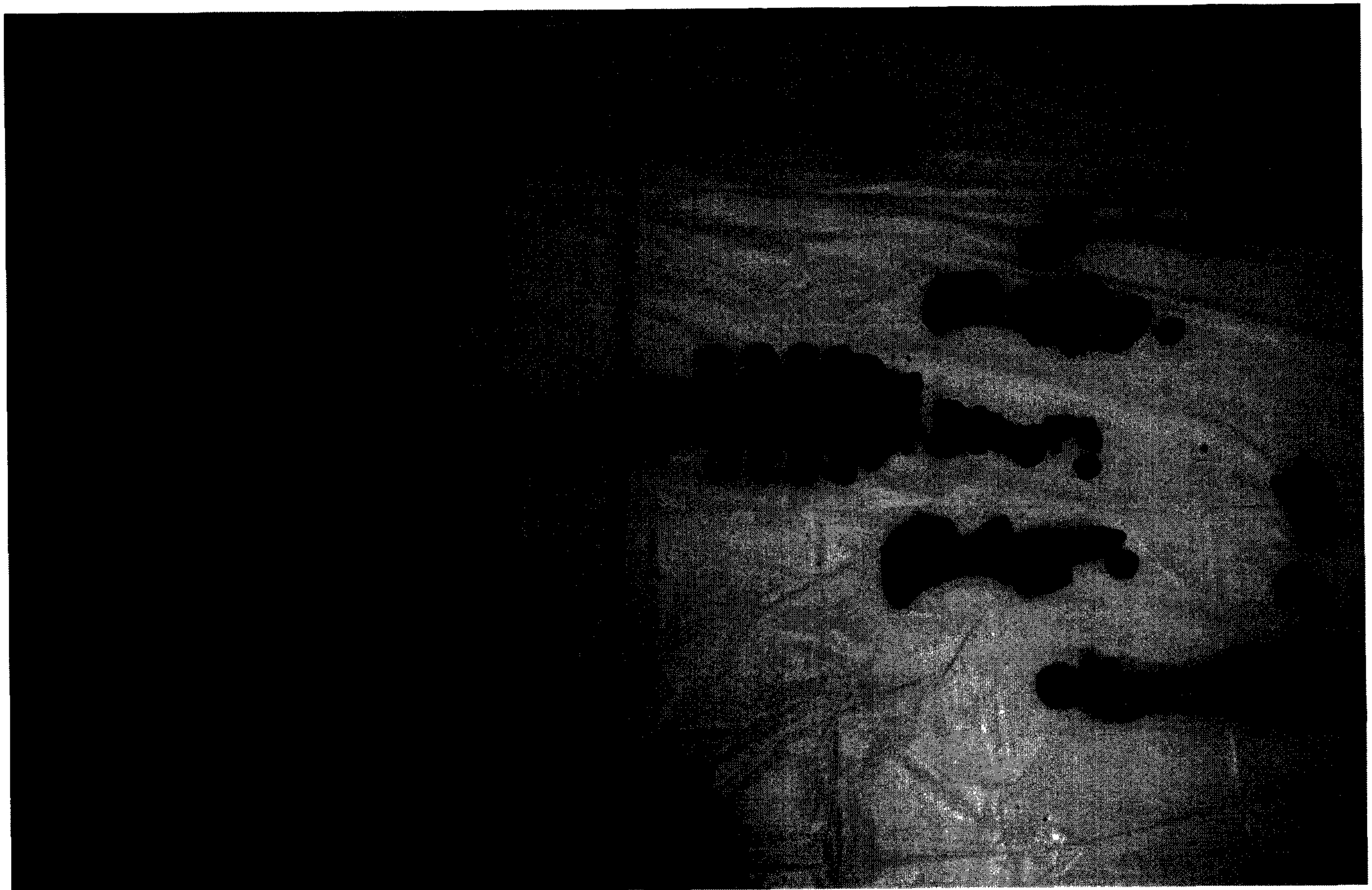

Figure 4.54 A mid-range image, of the skeletal remains of pig #1, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of trunk region of pig #1).

Figure 4.55 A mid-range image, of the skeletal remains of pig #1, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of caudal region of pig #1).

Figure 4.56 A mid-range image, of the skeletal remains of pig #2, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (note anterior region).

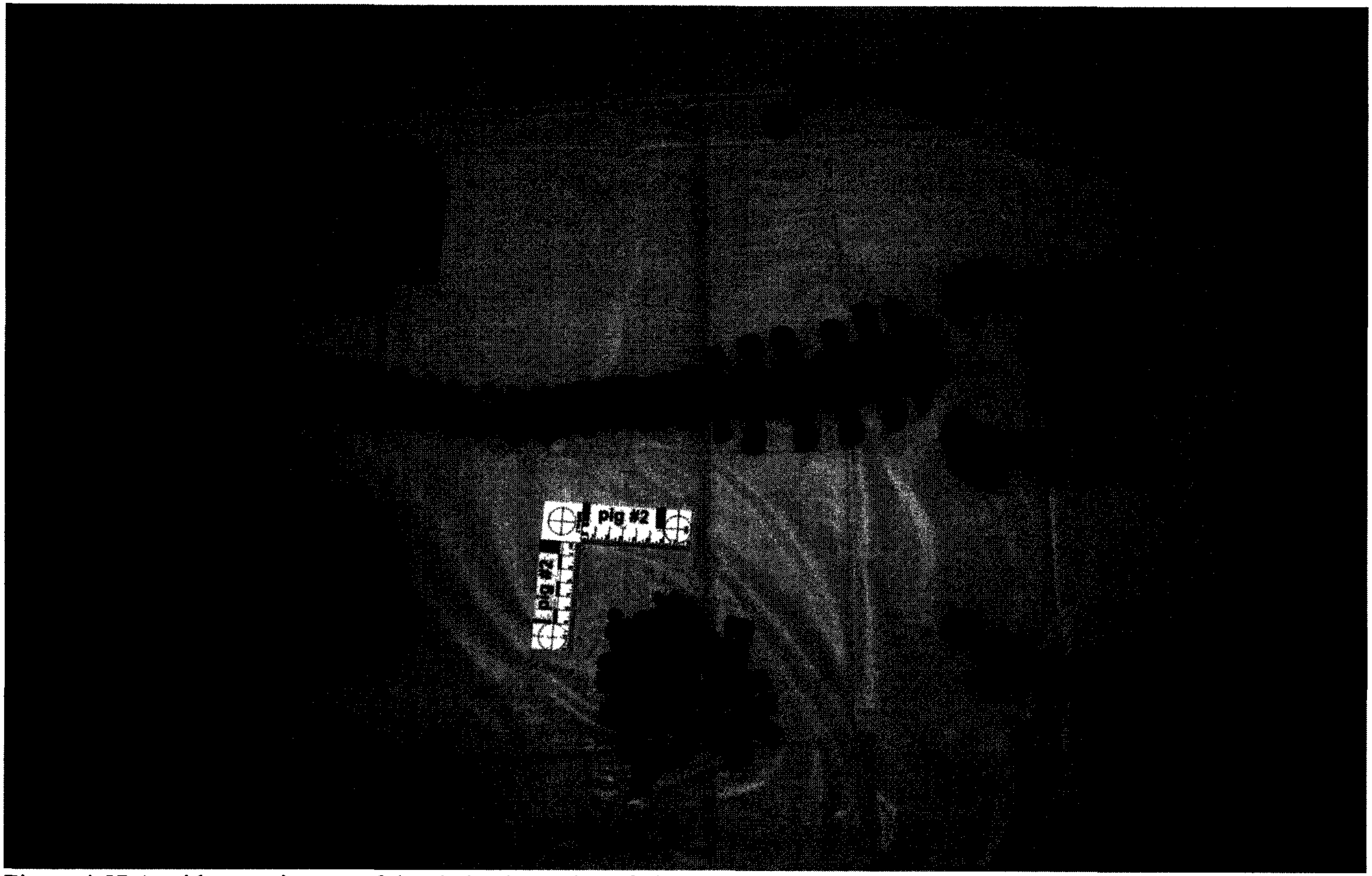

Figure 4.57 A mid-range image, of the skeletal remains of pig #2, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (note trunk region).

Figure 4.58 A mid-range image, of the skeletal remains of pig #2, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (note hind limb region).

4.3.2. Assessment of Burn Pattern Signatures in "Advanced Decomposition" Pig Pair

4.3.2.1. Thermal damages to the skeletal remains of pig #7

The burn pattern analysis on the skeletal remains of the "advanced decomposition" pig pair, pigs #7 and #8, revealed minimal thermal interaction between the simulated brush fire and the skeletal remains. Minimal thermal interaction was due to the large amounts of decomposed and mummified flesh present on the remains that protected the pig cadavers from the intensity of the fires. Heat-related skeletal trauma observed on both pigs #7 and pig #8 was primarily due to charring with evidence of calcination present on only pig #8. The thermal damages present on the skeletal remains of pig #7 included charring on the squamous and lateral aspect of the occipital bone, along the iliac crest of the left innominate bone, the crest of the right tibia, and the dorsal aspect of the right calcaneus and astragalus (Figures 4.59 to 4.65).

Figure 4.59 A mid-range image, of the skeletal remains of pig #7, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (note anterior region of pig #7).

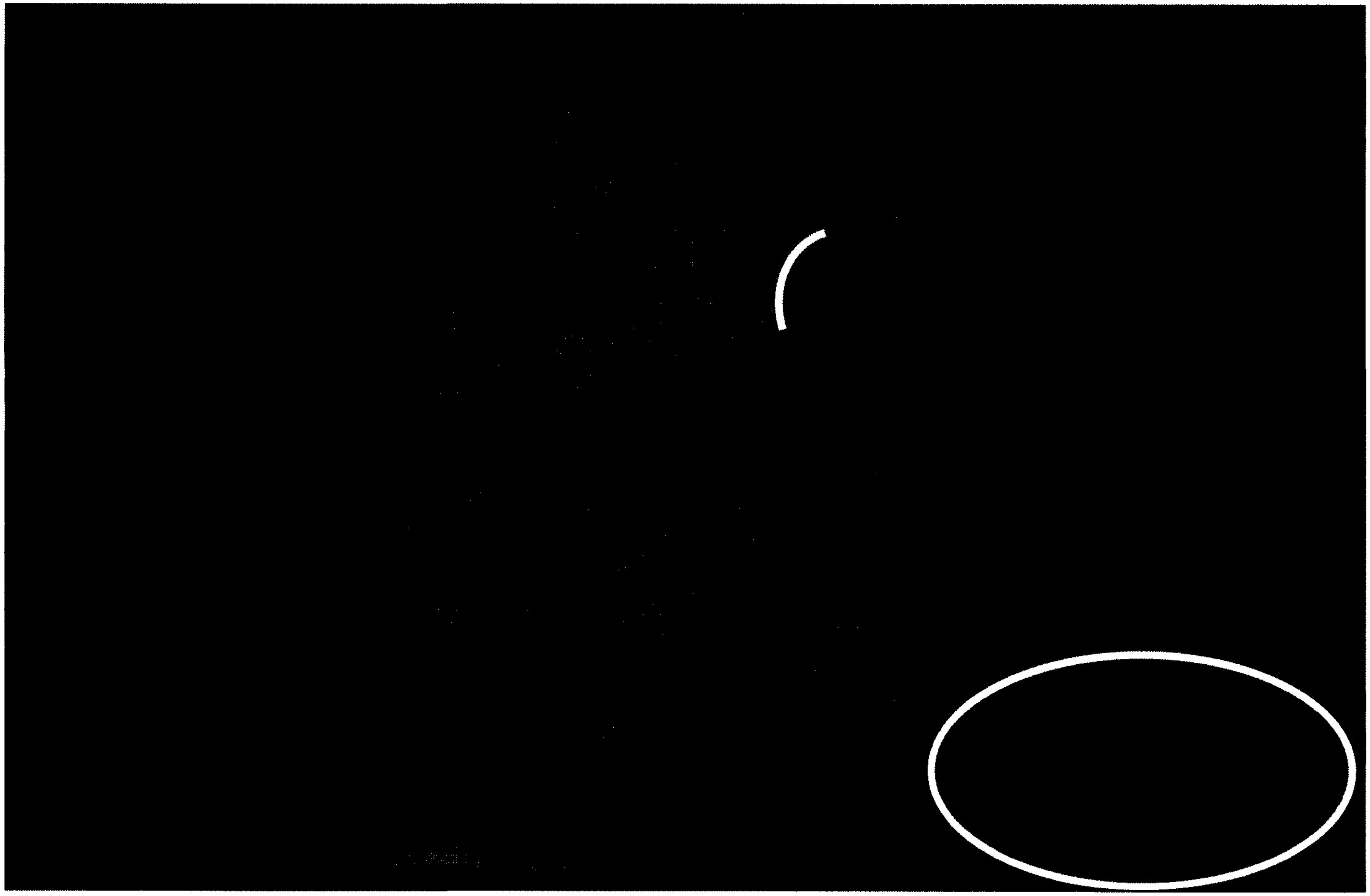

Figure 4.60 A mid-range image, of the skeletal remains of pig #7, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of trunk region of pig #7). Note that charring is present on the iliac crest of the left innominate bone (yellow arc) and the right hind limb (yellow circle).

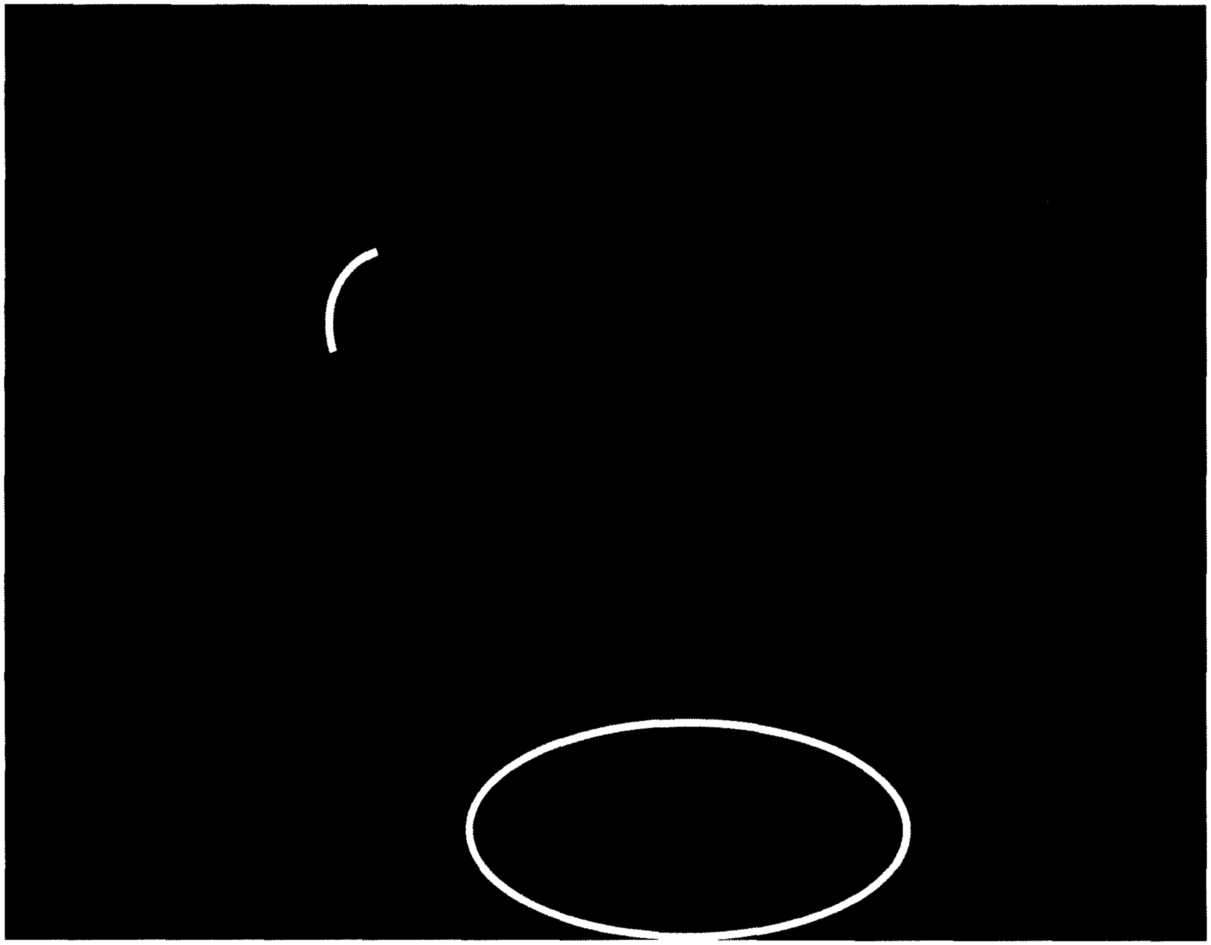

Figure 4.61 A mid-range image, of the skeletal remains of pig #7, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of caudal region of pig #7). Note the charring present on the iliac crest of the left innominate bone (yellow arc) and the right hind limb (yellow circle).

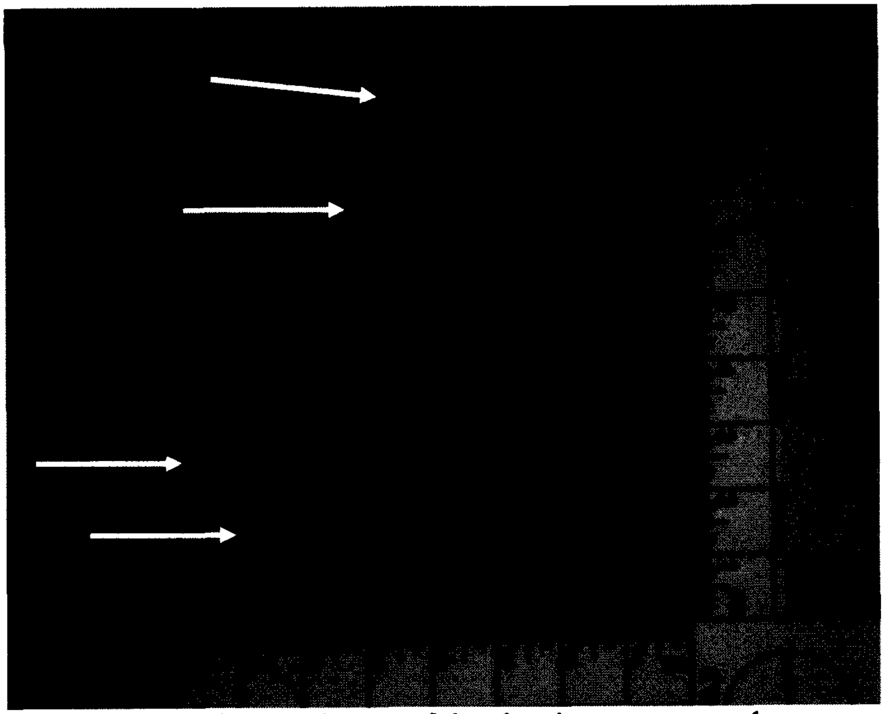

Figure 4.62 A close-up image of the charring present on the squamous and lateral aspects of the occipital bone of pig #7 (posterior view) (yellow arrows).

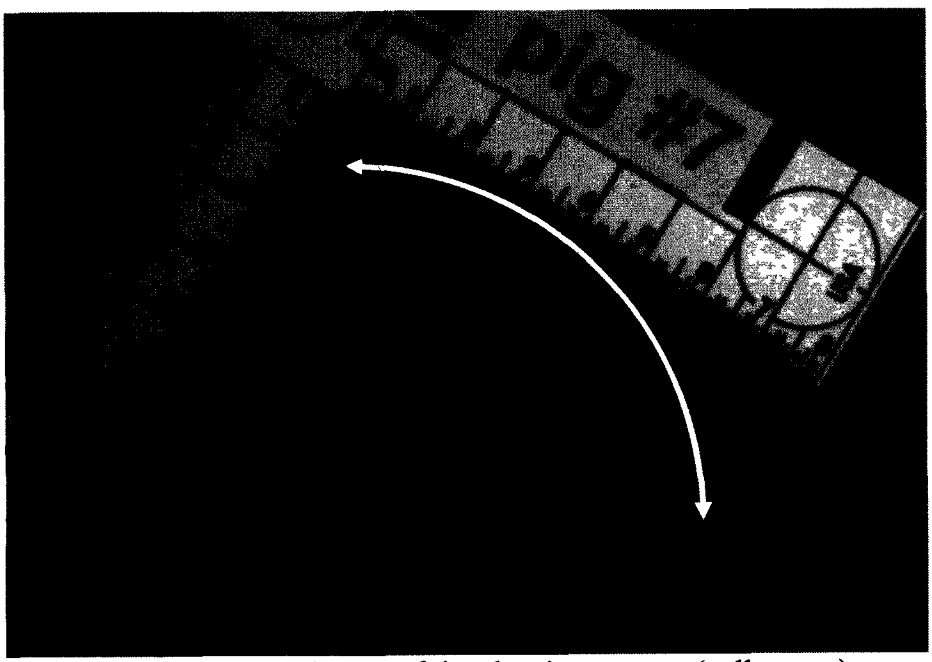

Figure 4.63 A close-up image of the charring present (yellow arc) on the iliac crest of the left innominate bone of pig #7 (superior-lateral view).

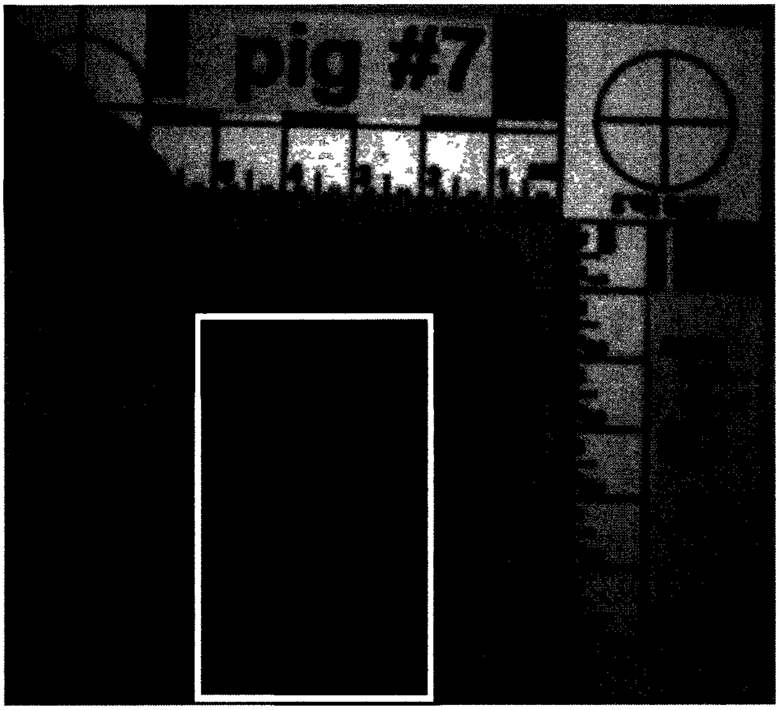

Figure 4.64 A close-up image of the charring present on the crest of the right tibia of pig #7 (yellow rectangle).

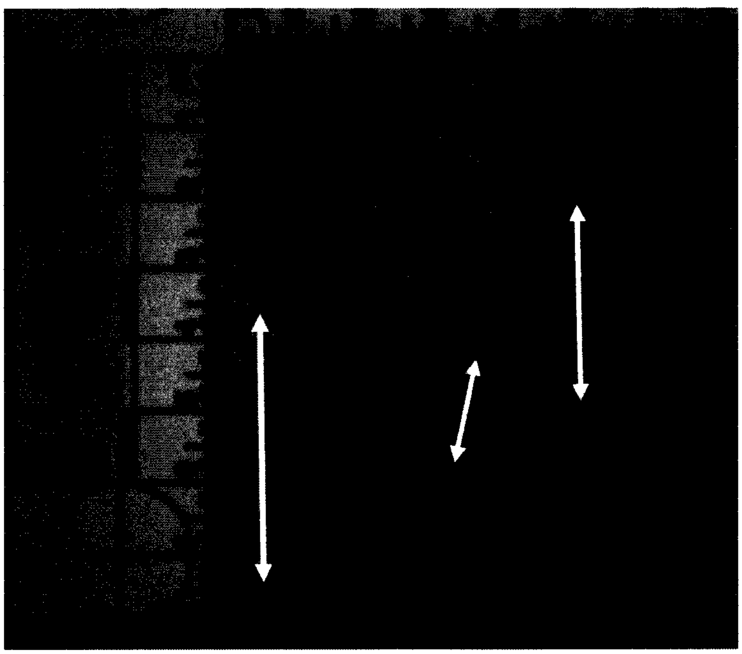

Figure 4.65 A close-up image of the right astragalus and calcaneus (left to right) of pig #7 with minimal amounts of charring present on the dorsal surface (yellow arrows).

4.3.2.2. Thermal damages to the skeletal remains of pig #8

Examination of the skeletal remains of pig #8 uncovered heat-related skeletal trauma present on the cranium, lumbar vertebrae, and the right proximal hind limb (Figures 4.66 to 4.68). A large amount of charring and calcination were primarily observed on the left lateral and posterior aspect of the cranium of pig #8. Charring was observed on the frontal bones, aspects of the parietal bones, the left temporal bone, the left lacrimal bone, the left malar bone, a portion of the left maxilla bone, the lateral and basilar aspect of the occipital bone, the body of the sphenoid, and the horizontal and perpendicular aspects of the palatine bones. Similar thermal damages were evident on the left aspect of the mandible, including the horizontal and ascending ramus, the coronoid process and condyle. Shades of black, grey, and white bone were present on the ascending ramus which indicated the mandible was exposed to temperatures in excess of 650°C (Figures 4.69 to 4.74).

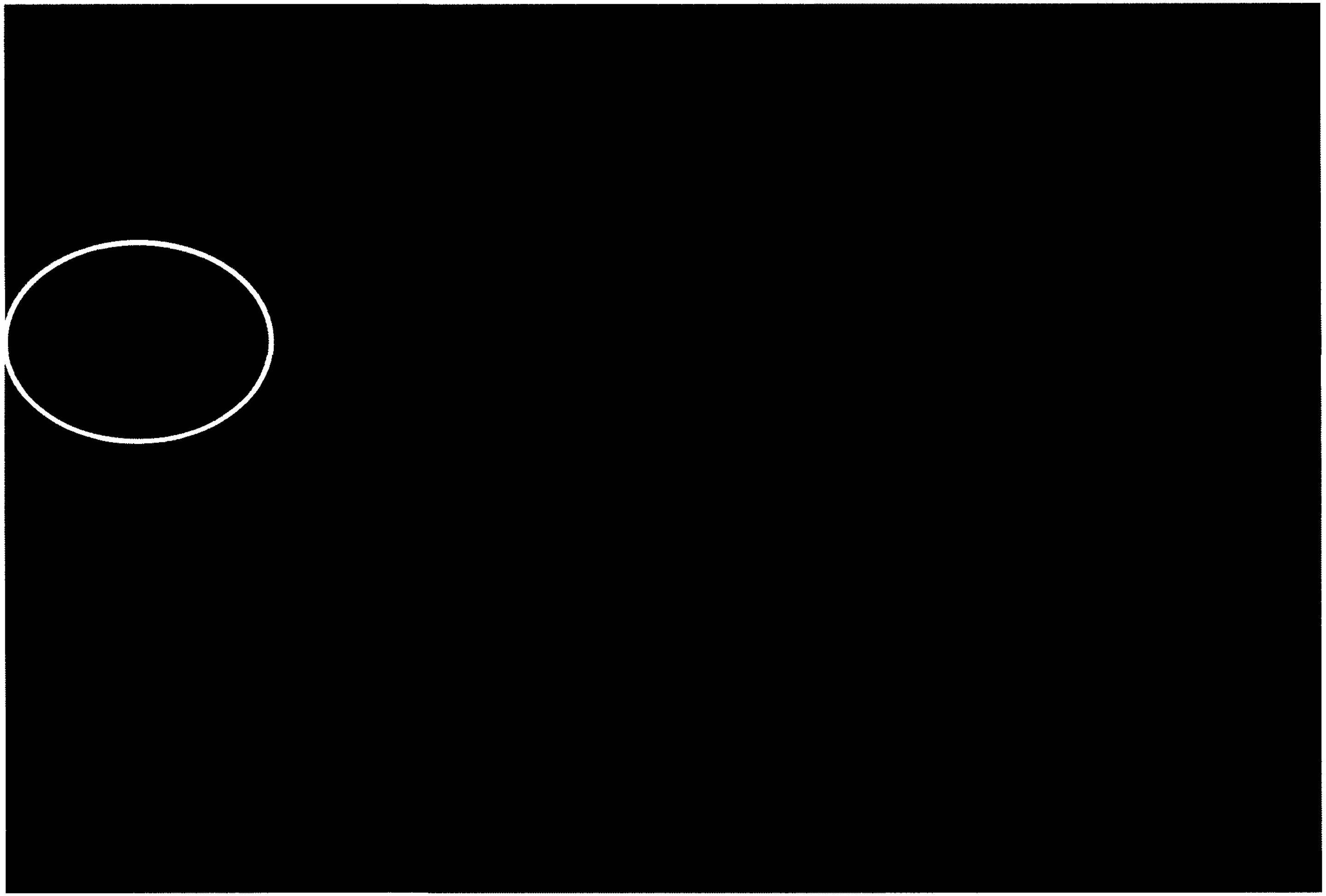

Figure 4.66 A mid-range image, of the skeletal remains of pig #8, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of cranial region of pig #8). Also note the extensive charring and calcination on the left lateral and posterior aspect of the cranium (yellow circle).

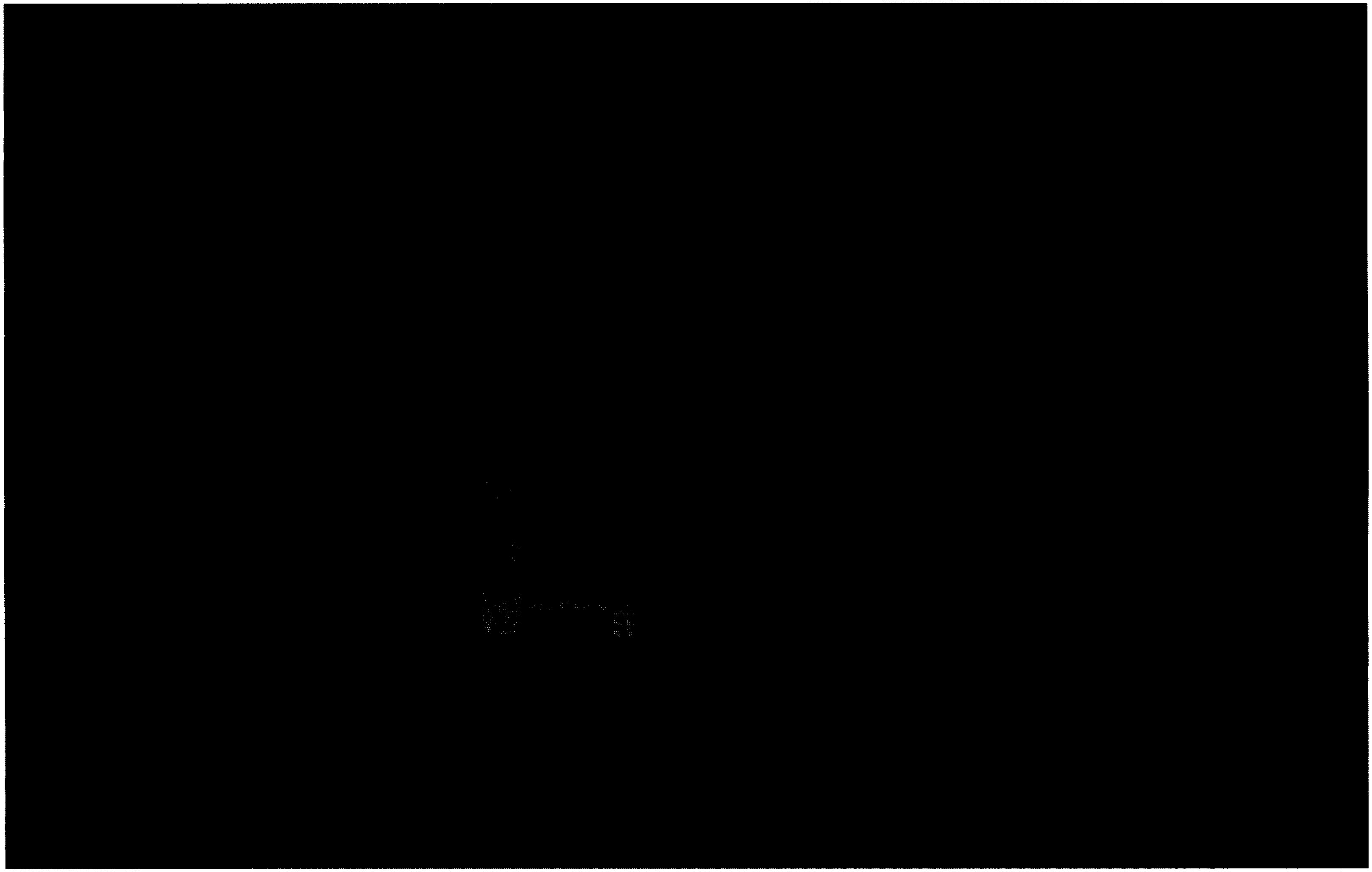

Figure 4.67 A mid-range image, of the skeletal remains of pig #8, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of trunk region of pig #8).

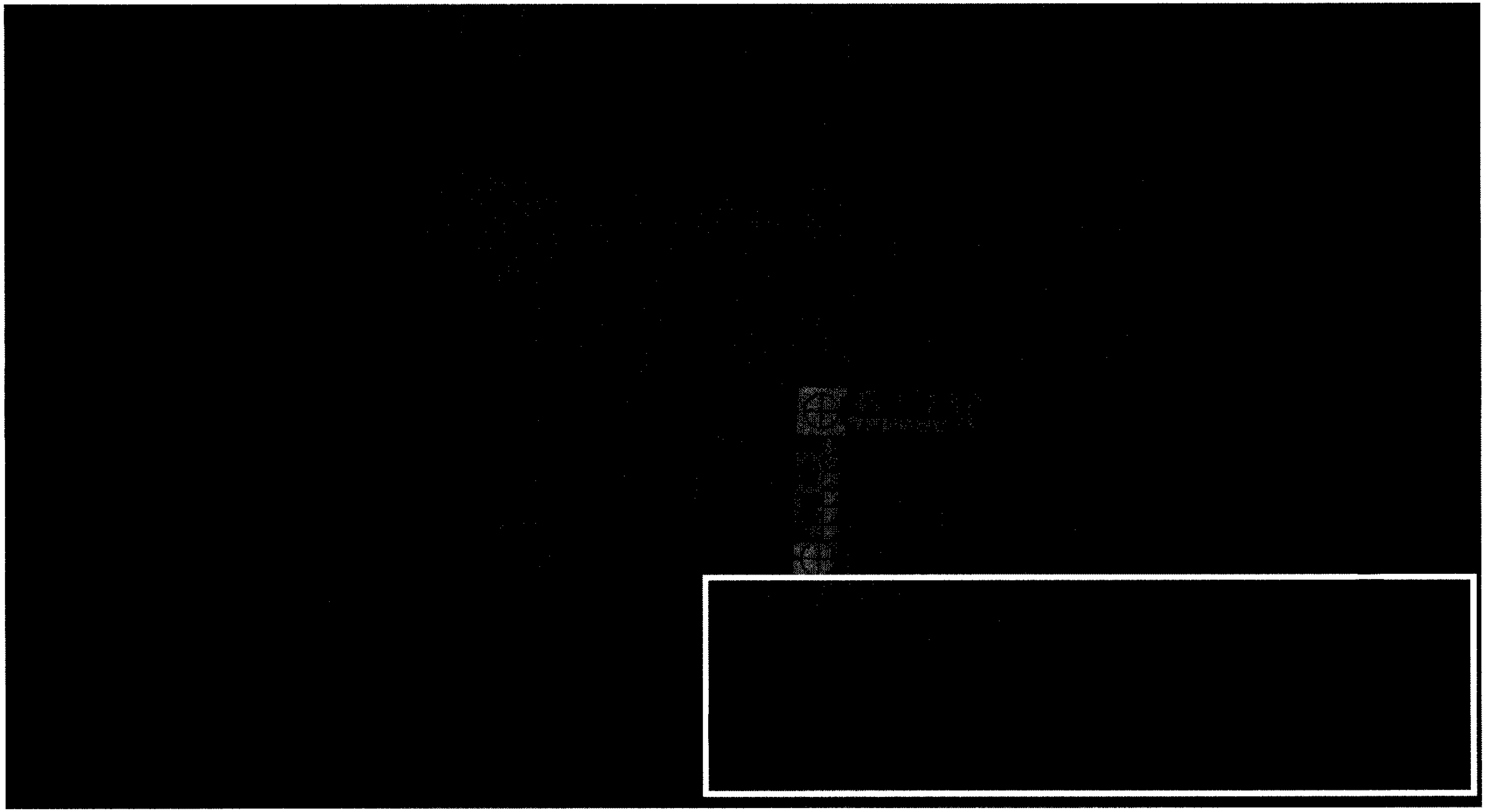

Figure 4.68 A mid-range image, of the skeletal remains of pig #8, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of the caudal region of pig #8). Also note the charring and calcination present on several skeletal elements of the right hind limb (yellow rectangle).

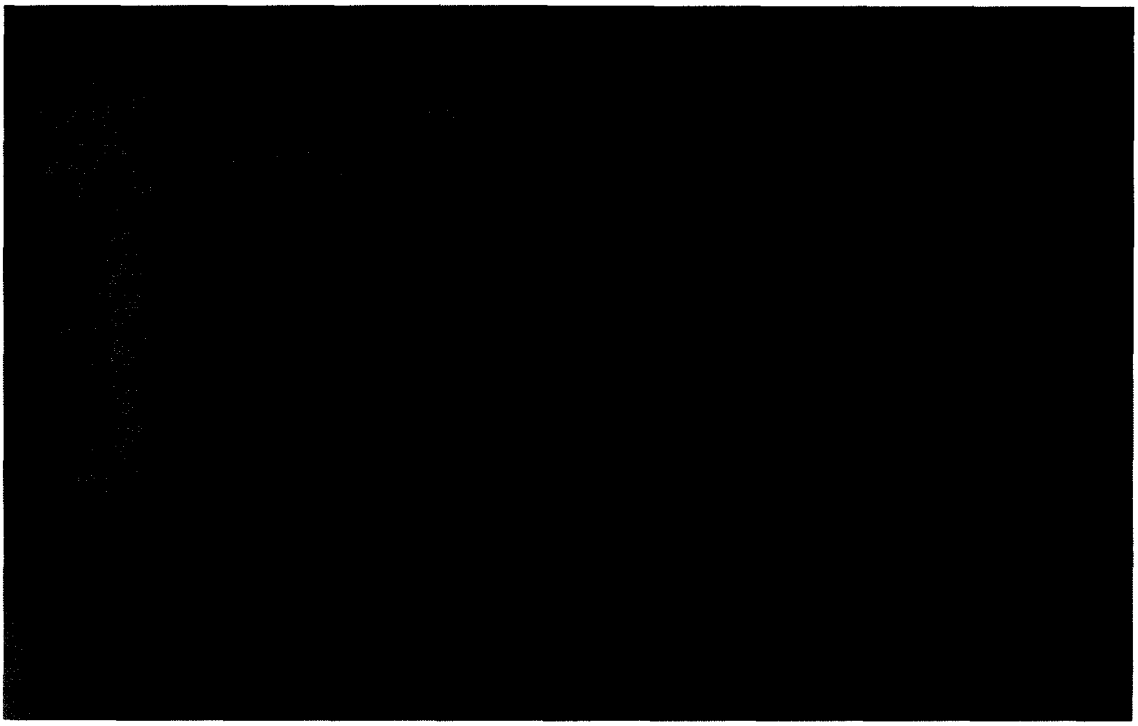

Figure 4.69 A mid-range image of the extensive charring and calcination present on the left lateral and posterior aspect of the cranium of pig #8.

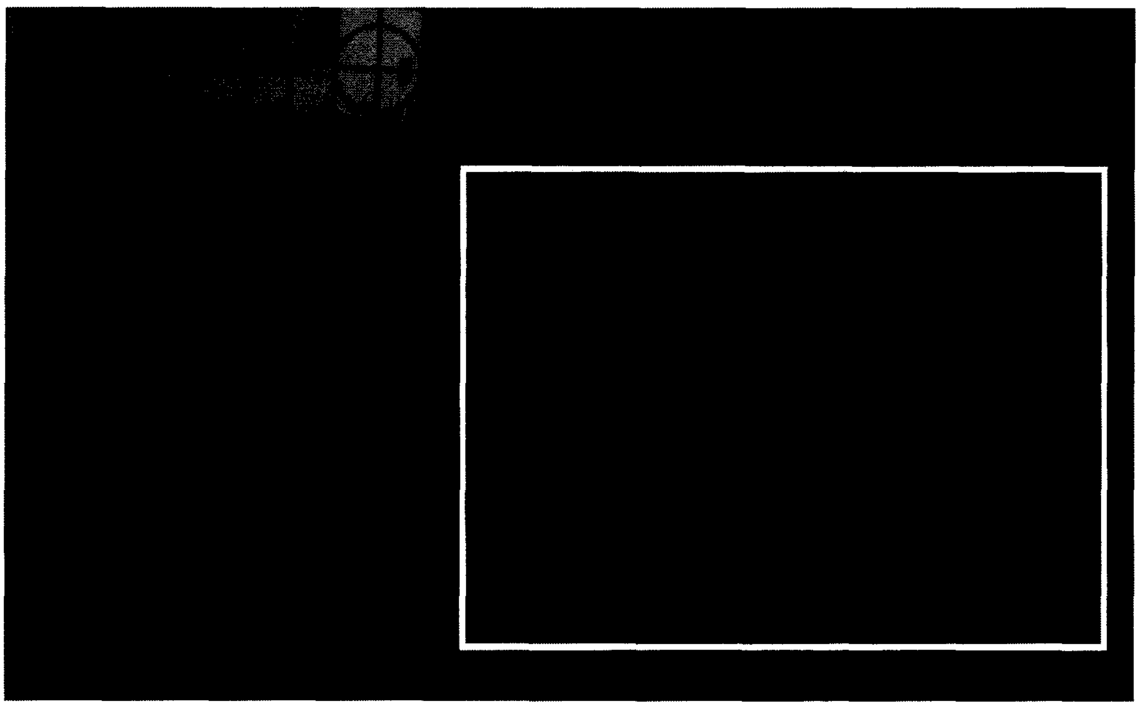

Figure 4.70 A mid-range image of the extensive charring and calcination (yellow rectangle) present on the left and right frontal and parietal bones and the left temporal bone of pig #8 (dorsal view).

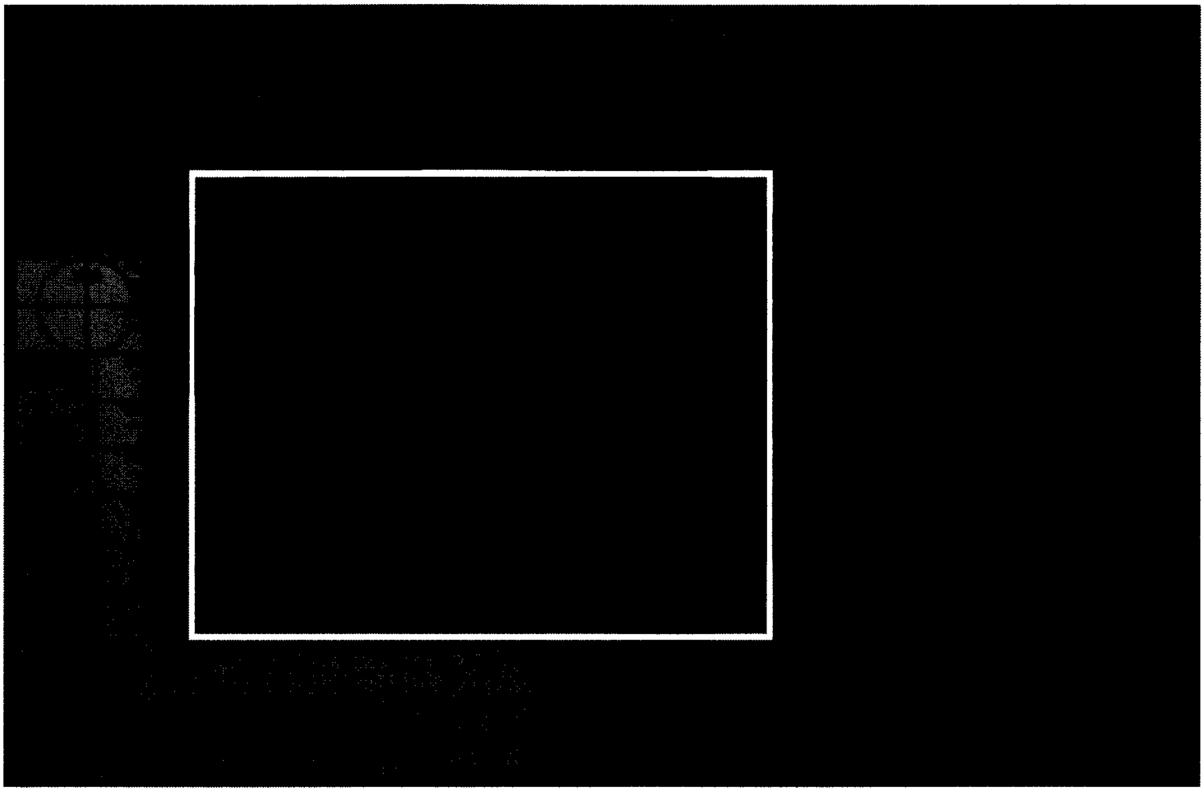

Figure 4.71 A mid-range image of the extensive charring and calcination on the ventral surface of the cranium of pig #8 (yellow rectangle).

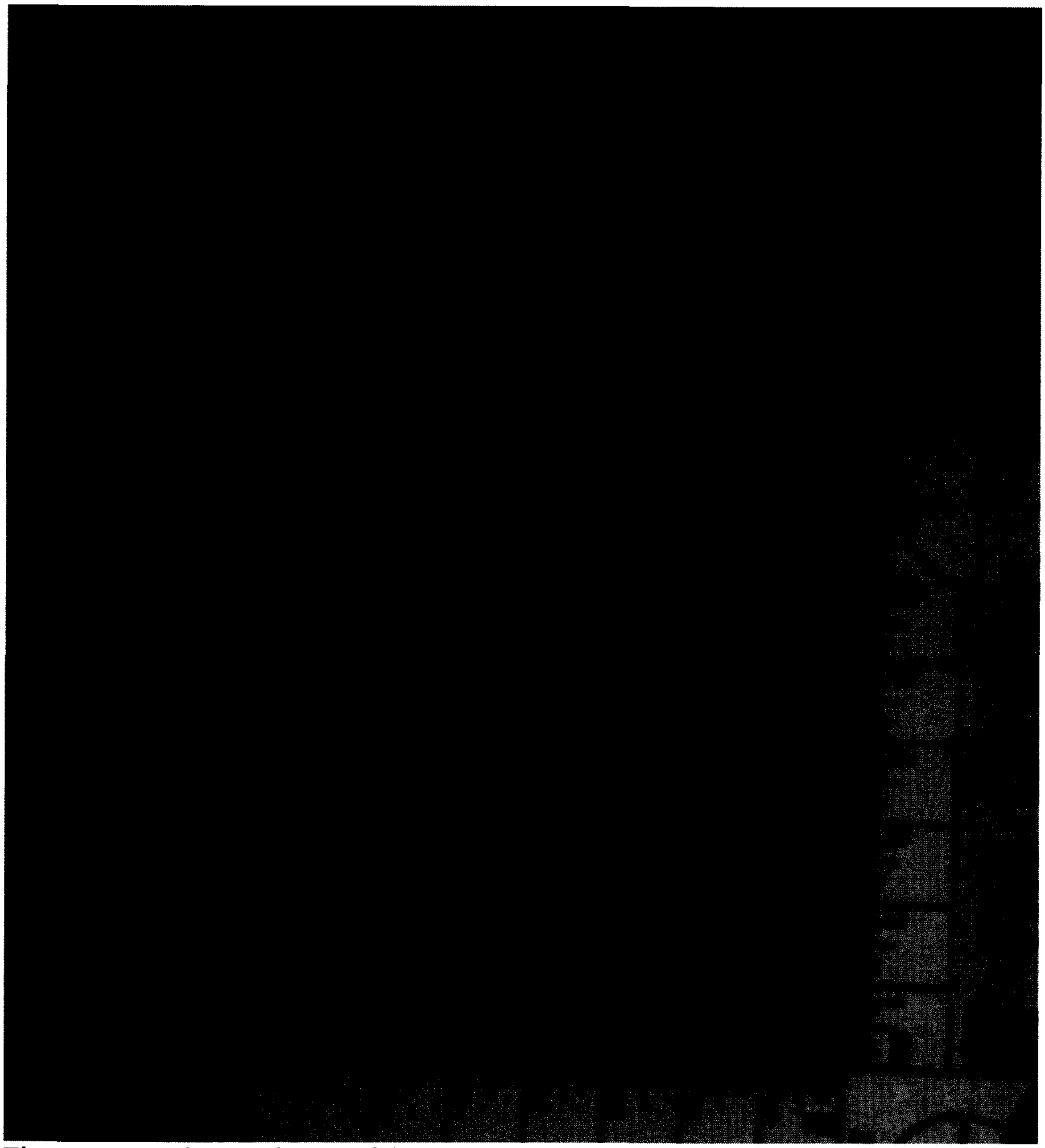

Figure 4.72 A close-up image of the extensive charring and calcination present on the left lateral-posterior aspect of the cranium of pig #8.

Figure 4.73 A close-up image of the charring present on the left lateral aspect of the horizontal ramus of pig #8. Note the thermal damage on the mandible made it susceptible to post mortem fragmentation along the ascending ramus (yellow arrow).

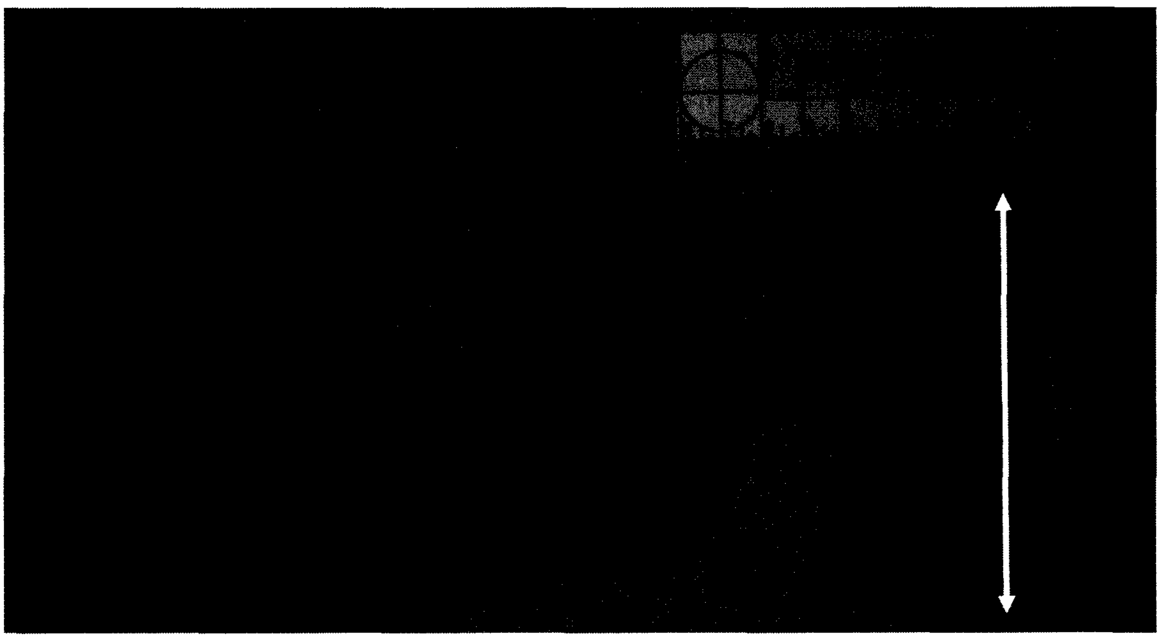

Figure 4.74 A mid-range image of the charring and calcination present on the left lateral aspect of the mandible of pig #8. Note the gradient of colour present on the left ascending ramus from the gonial angle to the coronoid process and condyle (yellow arrow).

Several skeletal elements of pig #8 were damaged post mortem because of the two localized fires that compromised the structural composition of the bone. As a consequence, many of the post mortem damages occurred during transportation from the field site to the lab. This included damage to the mandible, vertebrae, right tibia, right fibula, right third metatarsal, right astragalus, and right calcaneus (Figures 4.75 to 4.81). The only post mortem damage that occurred while still in the field was the removal of charring on the left transverse processes of the first and second lumbar vertebrae. The mechanism which may have caused the removal of the charred bone is unknown but may have been from weathering or small animal activity.

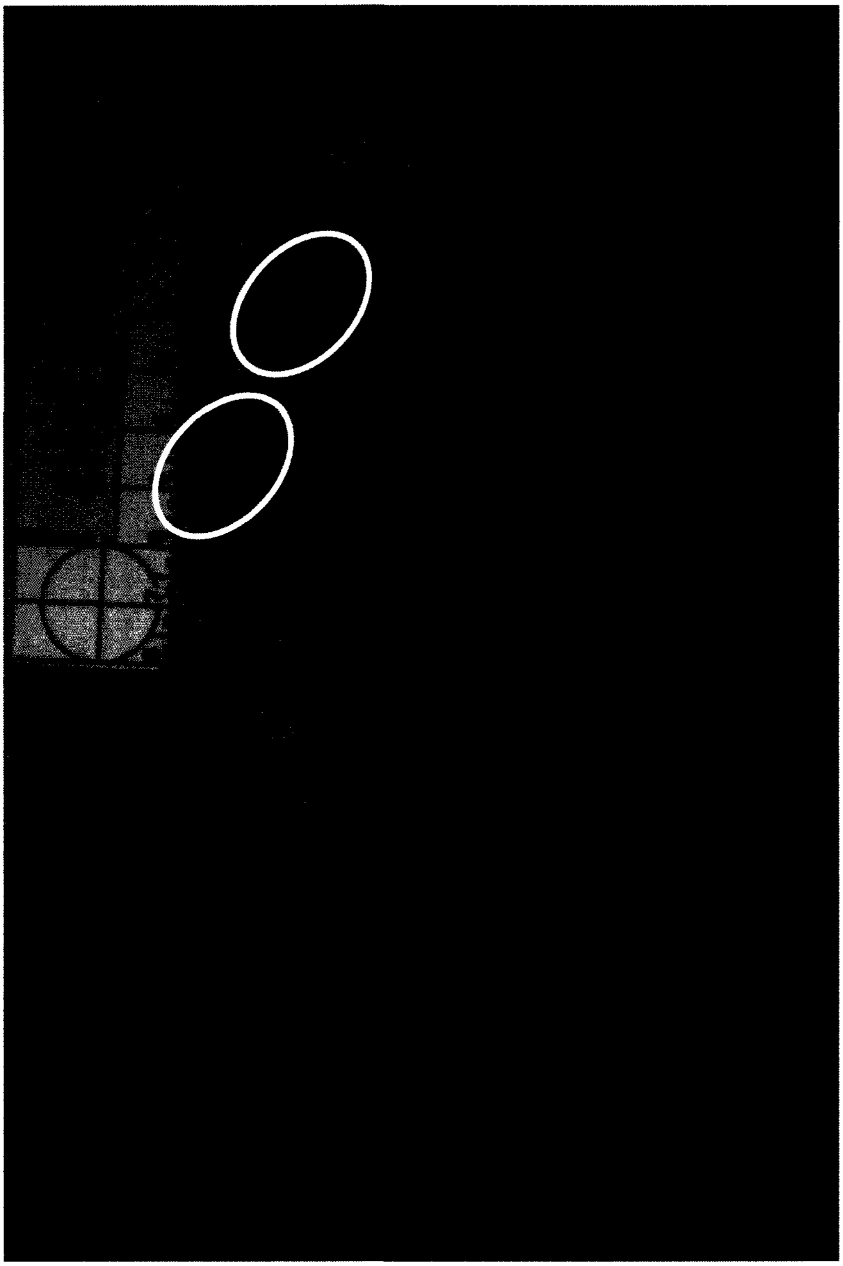

Figure 4.75 A close-up image of the five lumbar vertebrae of pig #8 (dorsal view). Note the post-mortem damage on the transverse processes of the first and second lumbar vertebrae which has removed the charred bone (yellow circles).

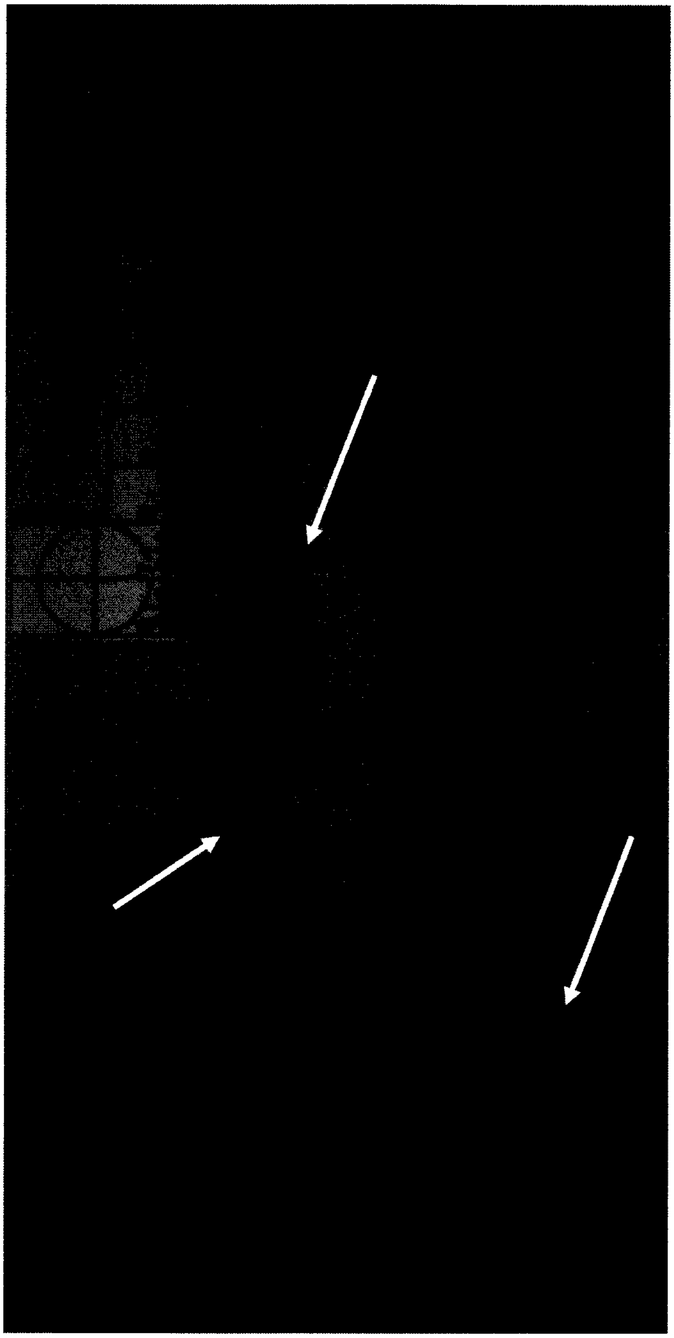

Figure 4.76 A mid-range image of the moderate amounts of charring present on the distal end of the right tibial metaphysis and epiphysis and the distal end of the fibula (cranial view). Note the post mortem break and fracture on the shaft on the fibula and distal one-half of the tibia (yellow arrows).

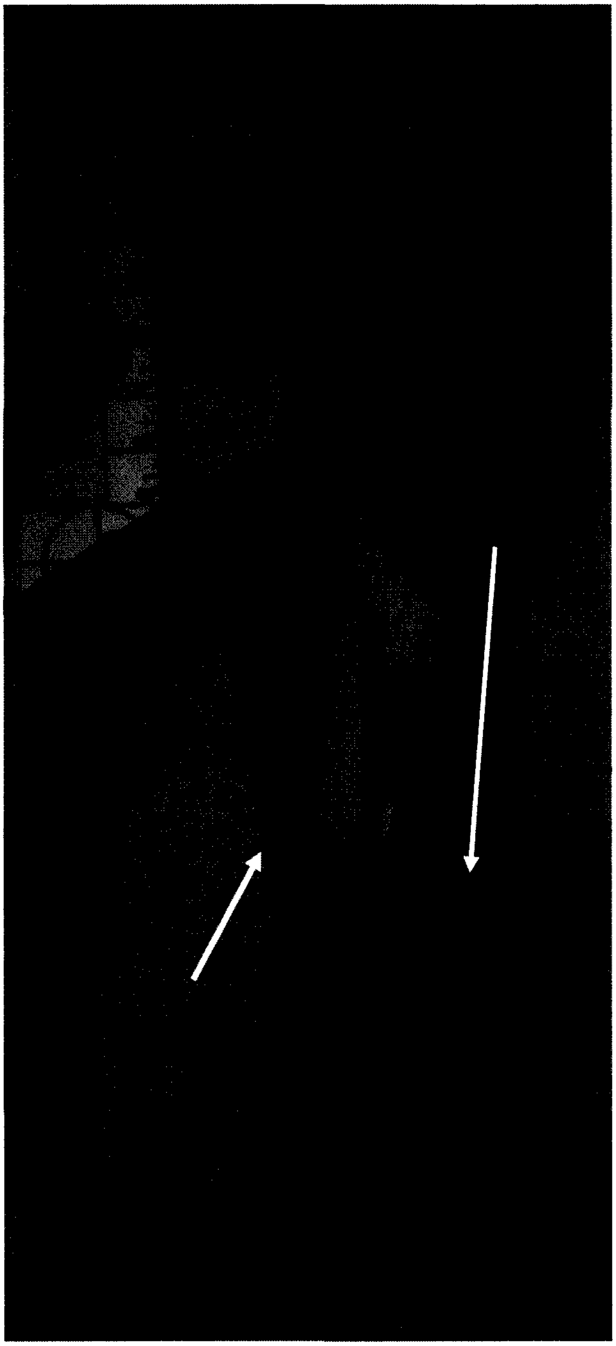

Figure 4.77 A mid-range image of the moderate amounts of charring present on the distal end of the right tibial metaphysis and epiphysis and the distal end of the fibula (caudal view of pig #8). Note the post mortem break and fracture on the shaft on the fibula and the distal one-half of the tibia (yellow arrows).

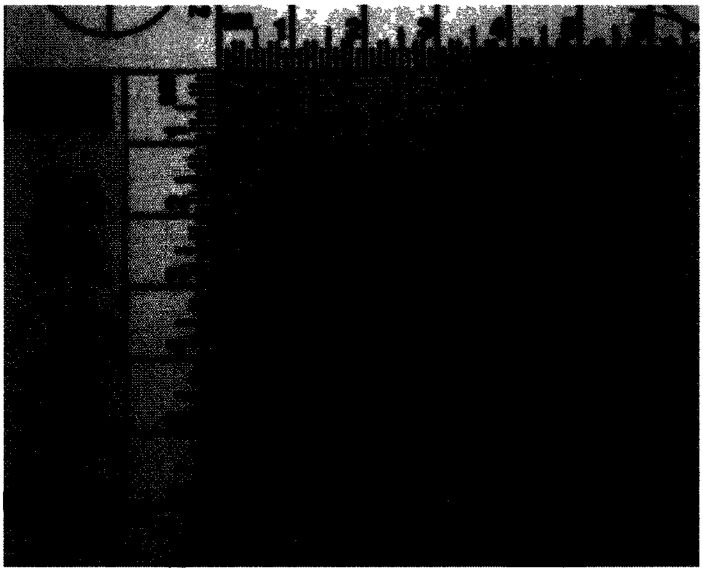

Figure 4.78 A close-up image of the extensive charring and calcination that was present on the right astragalus and calcaneus (left to right, dorsal view). Note the post mortem damage which has removed cortical bone on the dorsal surface of the astragalus and calcaneus.

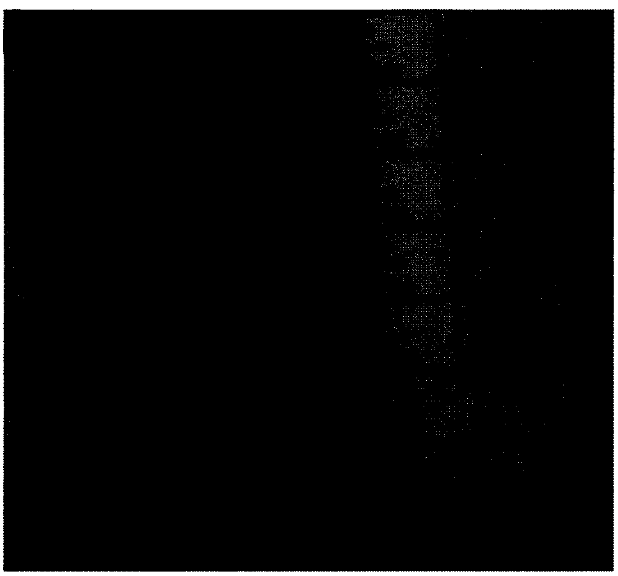

Figure 4.79 A close-up image of the charring and calcination present on the proximal half of the third and fourth right metatarsal (right to left, dorsal view). Note the post mortem break on the shaft of the right third metatarsal.

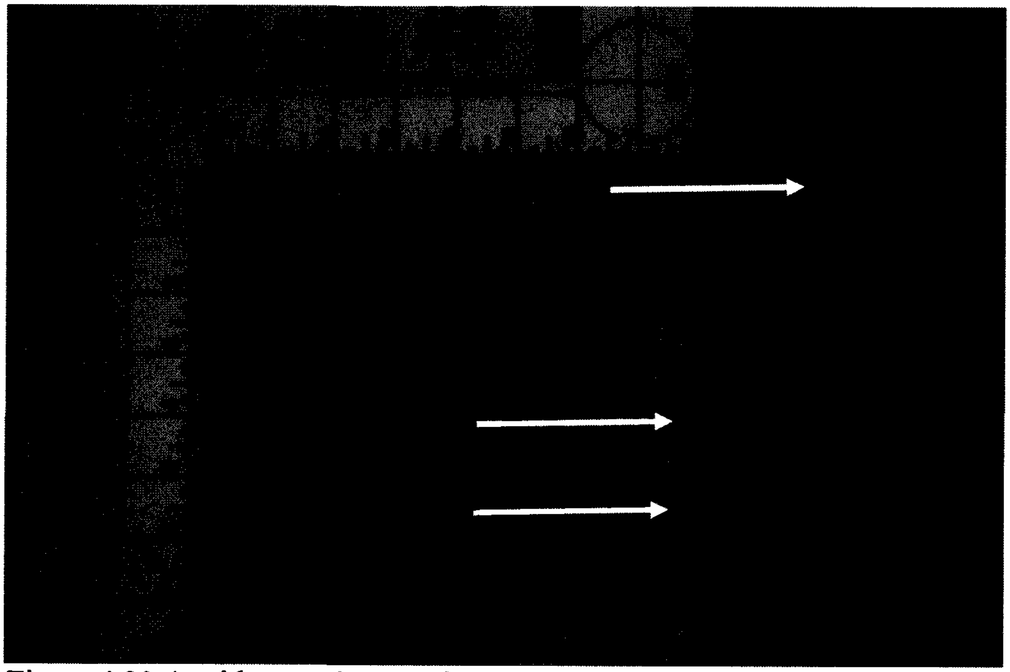

Figure 4.80 A mid-range image of the heavy charring and calcination present on the second and fifth metatarsal and a right tarsal bone (yellow arrows).

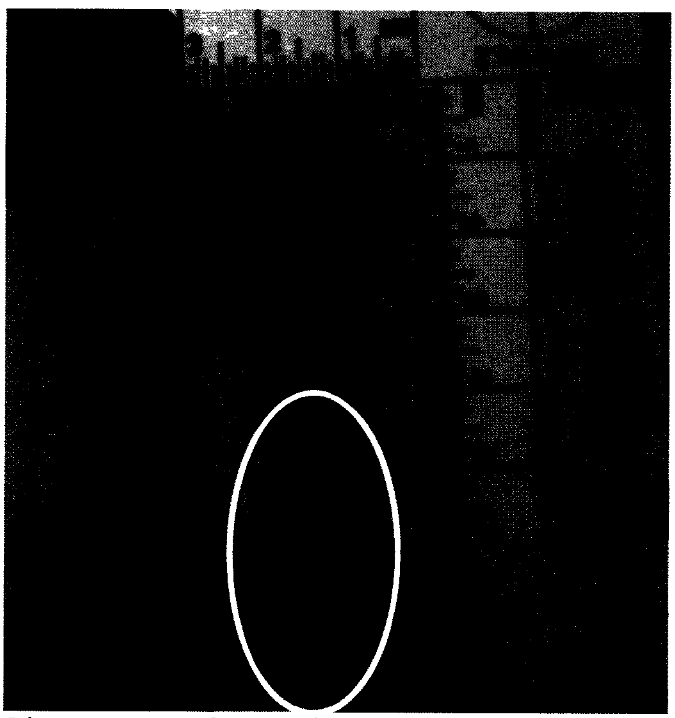

Figure 4.81 A close-up image of the charring present on the lateral aspect of the third left metatarsal of pig #8 (yellow circle).

4.3.2.3. No Notable Burn Pattern Signature for Remains in an Advanced Stage of Decomposition

For the advanced decomposition stage, the heat related skeletal trauma was minimal due to the protection afforded by the mummified tissues and decomposed tissues and fat present on the remains. As a result, there was a limited amount of charring and calcination present on the skeletal remains available for comparative purposes. Charring on the skeletal remains of pig #7 was only found on limited aspects of the occipital bone of the cranium, the left innominate and the right tibia, astragulus and calcaneus. Similarly, charring on the skeletal remains of pig #8 was only found on limited aspects of the lumbar vertebrae, the right tibia and fibula and the left third metatarsal. Charring and calcination were only present on the remains of pig #8 within the "advanced decomposition" pig paired group. Charring and calcination were found on the lateral and posterior region of the cranium and on the right calcaneus, astragulus and the third and fourth metatarsals.

In summary, the only anatomical regions used for thermal comparison were in the head and hind limb regions. However, only primary amounts of charring were present in these two anatomical regions for pig #7, whereas primary amounts of calcination and secondary amounts of charring were present in the same regions for pig #8. Thermal injuries were also only found in the right hind limb of pig #7; however, they were present in both hind limbs of pig #8. These findings were tabulated in two three-dimensional images and utilized for comparison of the thermal damages (Figures 4.82 to 4.83). Ultimately, although pigs #7 and #8 both received heat related skeletal trauma, there was an insufficient amount of comparative data between this pig paired group to define a unique pattern. There was a lack of overlap between the severities of their thermal injuries and the specific landmarks or features that were affected. Therefore, due to lack of comparative heat-related skeletal injuries, no significant or predictable burn pattern signature could be identified for the state of "advanced decomposition."

Figure 4.82 An anatomical diagram illustrating the areas of charring (red circles) identified on the skeletal remains of pig #7 (left lateral view) (www.turbosquid.com).

Figure 4.83 An anatomical diagram illustrating the areas of charring (red circles) and calcination (yellow circles) identified on the skeletal remains of pig #8 (left lateral view) (www.turbosquid.com).

4.3.3. Assessment of Burn Pattern Signatures in "Skeletonization" Pig Pair

4.3.3.1. Thermal damages to the skeletal remains of pig #5

The most extensive, and expected, heat-related skeletal trauma was observed on the remains of the "skeletonization" pig pair, pigs #5 and #6. Since more than 50% of the skeletal remains were visible prior to simulating the brush fires, there was an insufficient amount of decomposed or mummified tissue present to protect the surface of the remains from interacting with the fire. The extent of the thermal damage on pig #5 was primarily oriented on the left side of the trunk and posterior regions; however, there was additional charring and calcination present on the right gonial angle of the mandible (Figures 4.84 to 4.86). The injuries on pig #5 were consistent with the two localized fires which resulted from the brush fire.

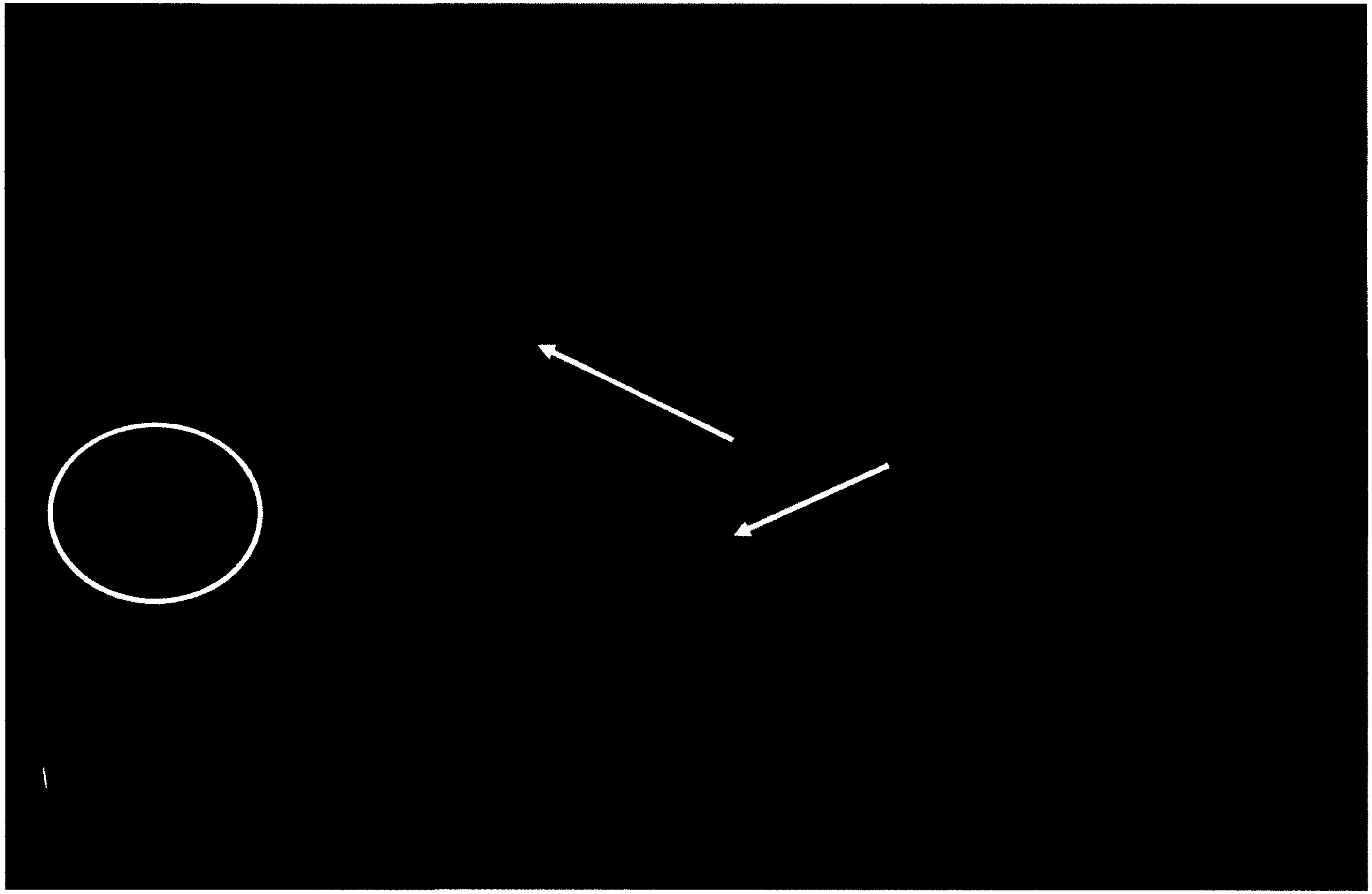

Figure 4.84 A mid-range image, of the skeletal remains of pig #5, displaying the discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (overview of the cranial region of pig #5). Note that there is minimal thermal damage present in this region and it is mostly located on the right aspect of the mandible (yellow circle) and the sternal ends of several right and left ribs (yellow arrows).

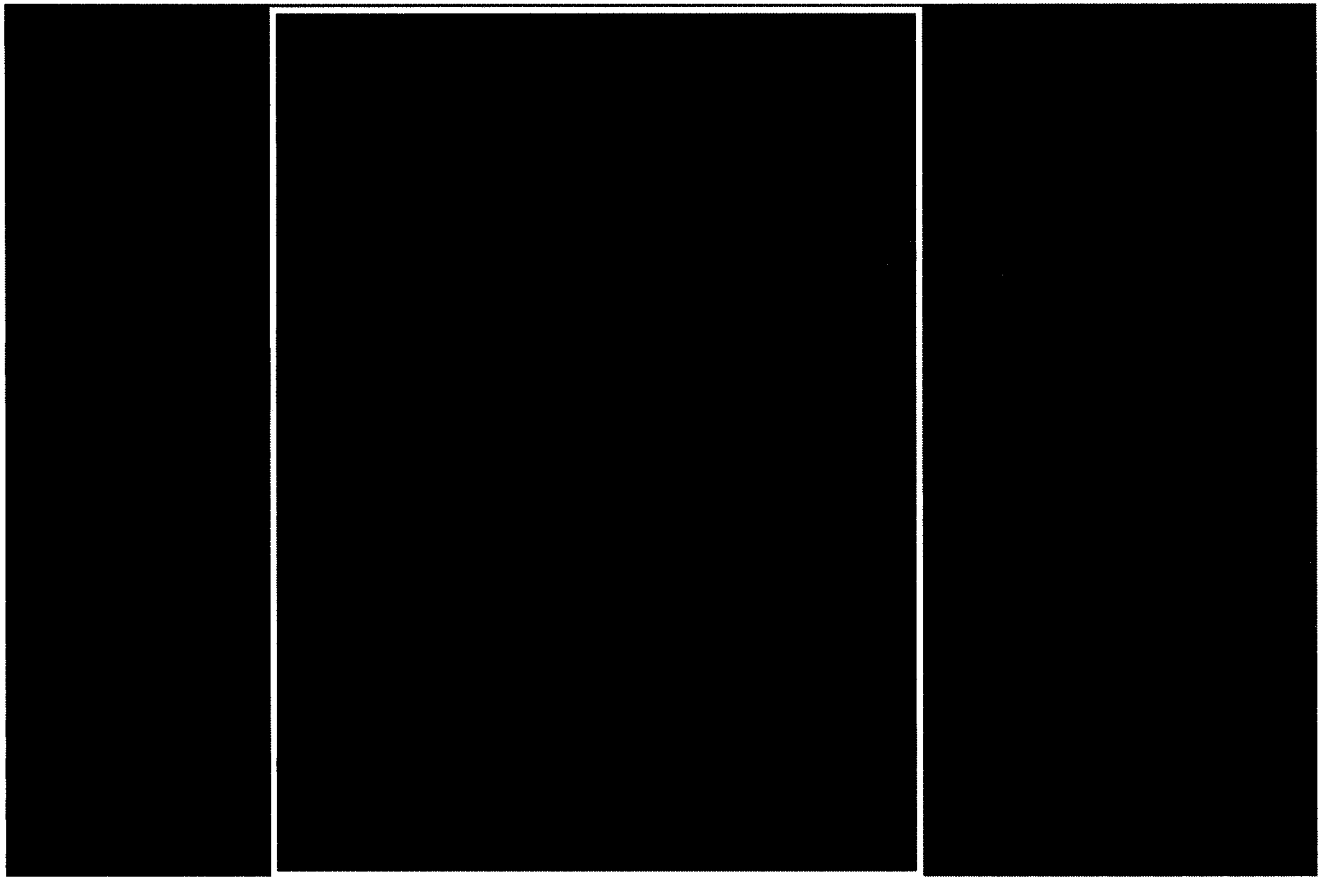

Figure 4.85 A mid-range image, of the skeletal remains of pig #5, displaying discolouration patterns due to soil interaction, contact with decomposing tissues and fluid, and sun bleaching (note trunk and caudal region of pig #5). Note that there is extensive thermal damage located in the lumbar vertebrae, the pelvic girdle region, and the long bones of the hind limbs (yellow rectangle).

Figure 4.86 A mid-range image of the thermal and post mortem damage present on the right gonial angle on the mandible of pig #5 (right lateral view).

Based on observations of the skeletal remains, it was evident that the most intense area of thermal damage was located in the lower trunk and pelvic girdle region. This was consistent with the evidence of charring and calcination present on the transverse and spinous processes of the fifth and sixth lumbar vertebrae, all sacral vertebrae, the pubic symphysis and acetabulum for the left and right innominate bones, and the proximal one-fourth of the left femur (Figures 4.87 to 4.93). The charring and calcination present on the neck and proximal epiphyses of the left femur displayed black, grey, and blue shaded regions of bone, indicating that the remains sustained exposure to temperatures above 650 °C.

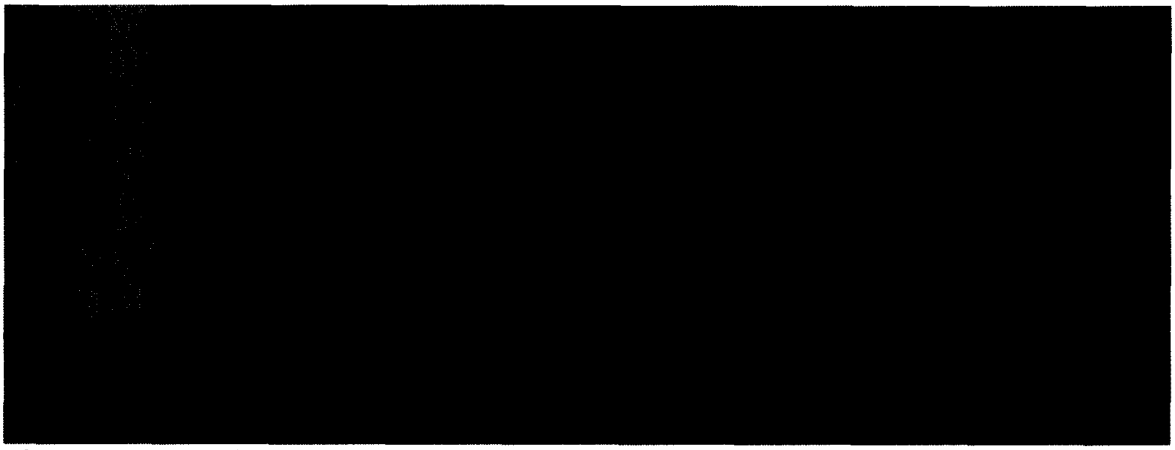

Figure 4.87 A mid-range image of the left lateral view of the lumbar vertebrae. Note the shades of black, grey, and blue coloured bone present.

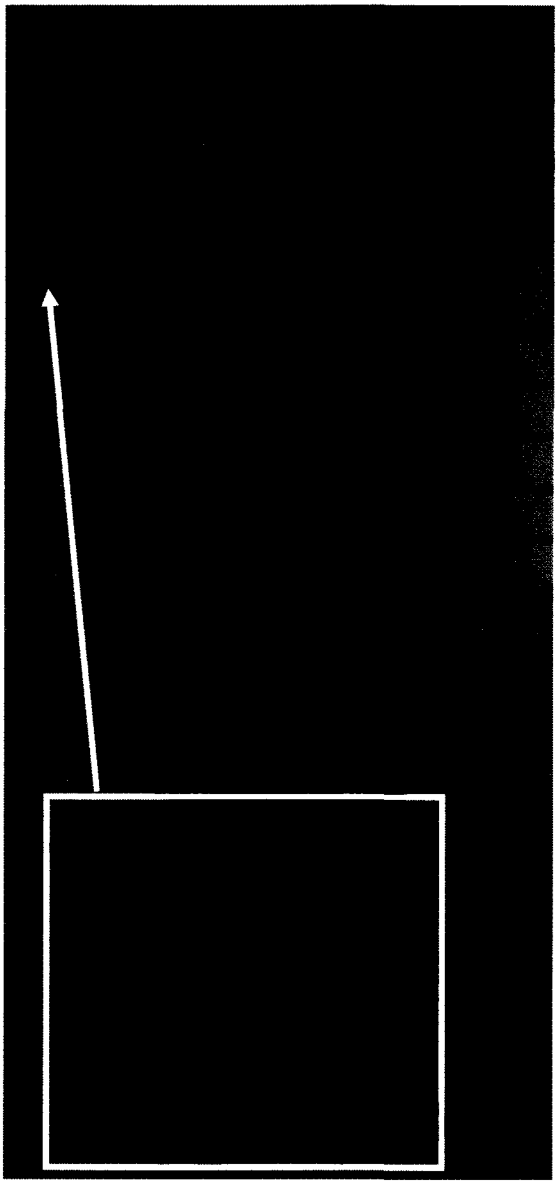

Figure 4.88 A mid-range image of the lumbar vertebrae of pig #5 (dorsal view). Note the heavy charring present on the left lateral aspect of lumbar vertebrae #1 to #4 (yellow arrow). Also note the calcination present on lumbar vertebrae #5 and #6 (yellow rectangle).

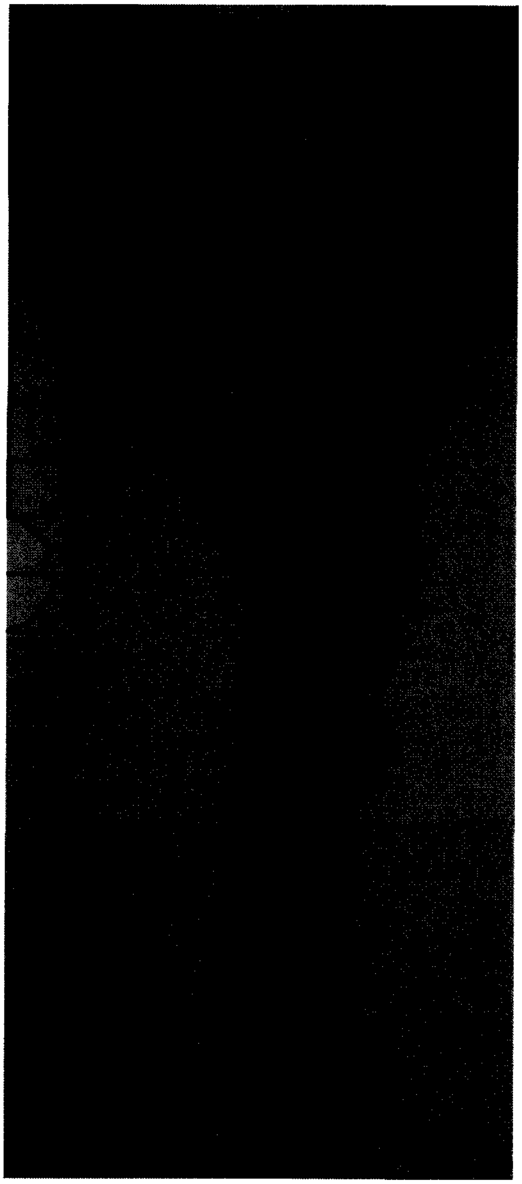

Figure 4.89 A mid-range view of the extensive charring and calcination present on the sacral vertebrae of pig #5 (dorsal view). Note the shades of black, grey, and blue bone present.

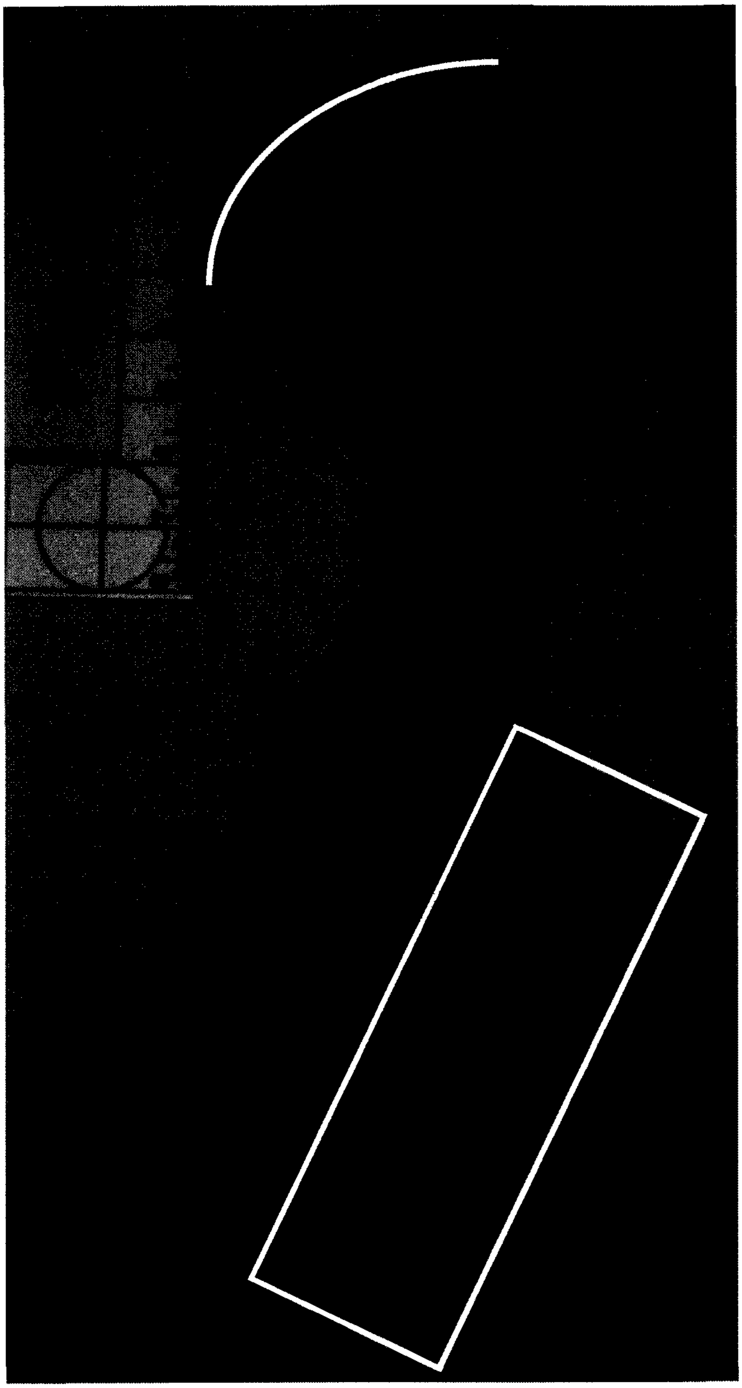

Figure 4.90 A mid-range image of the right innominate bone of pig #5 (lateral view). Note the heavy charring present on the iliac crest (yellow arc) and the heavy charring and calcination present on the pubis (yellow rectangle).

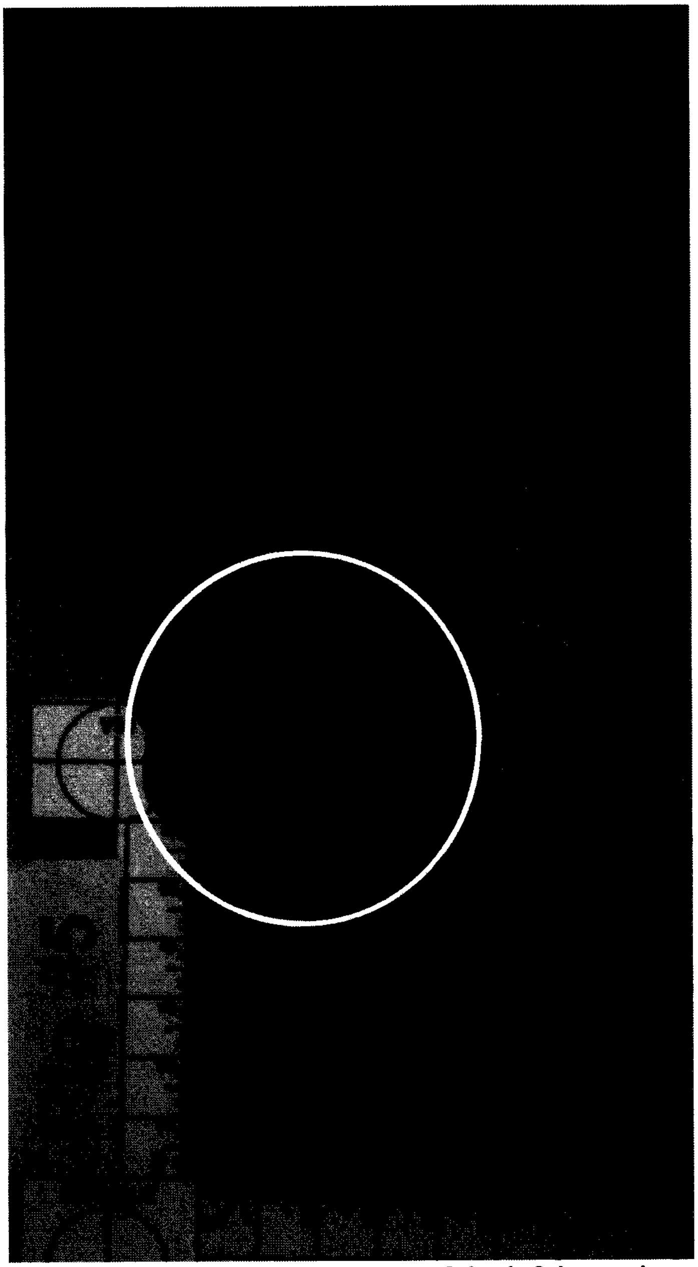

Figure 4.91 A mid-range image of the left innominate bone of pig #5 (lateral view). Note the heavy charring and calcination present on the entire lateral aspect of the bone especially the acetabulum (yellow circle).

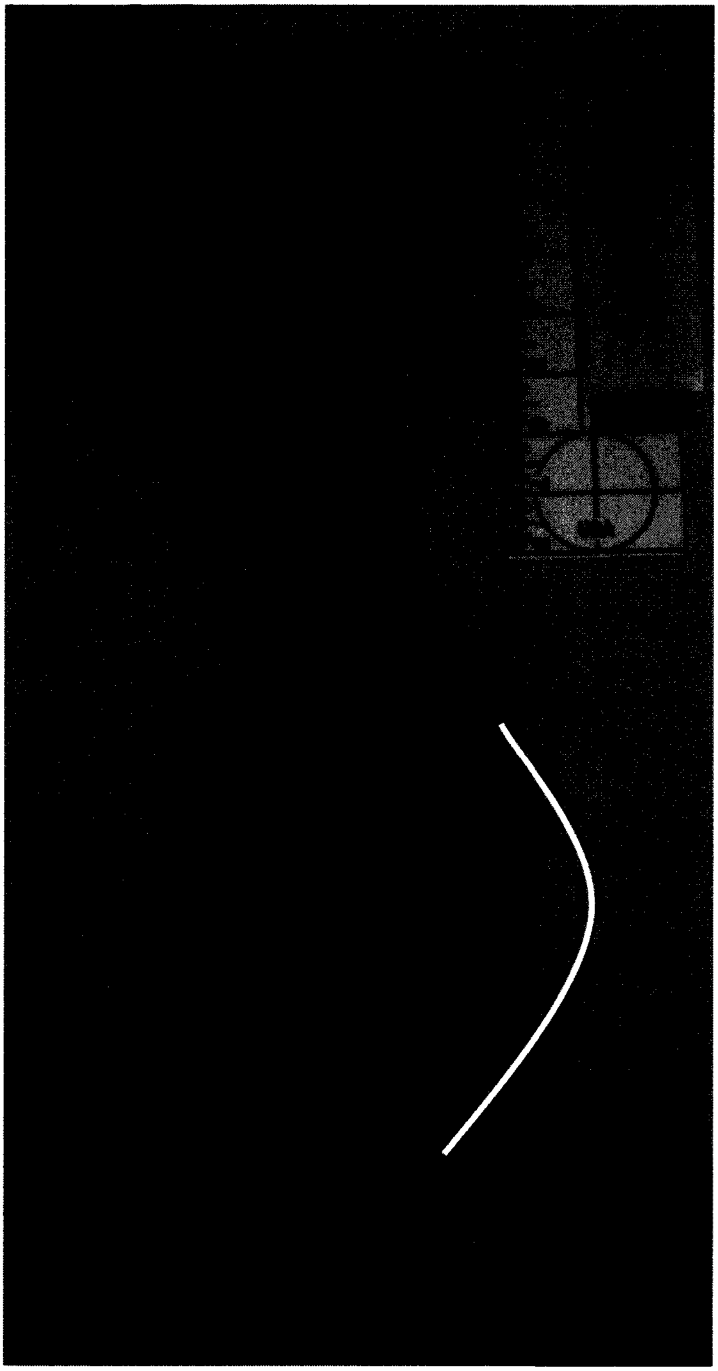

Figure 4.92 A mid-range view of the left innominate bone of pig #5 (medial view). Note portions of the auricular surface and shaft of the illium were destroyed by charring or calcination, as illustrated in the pubis region of bone (yellow arc).

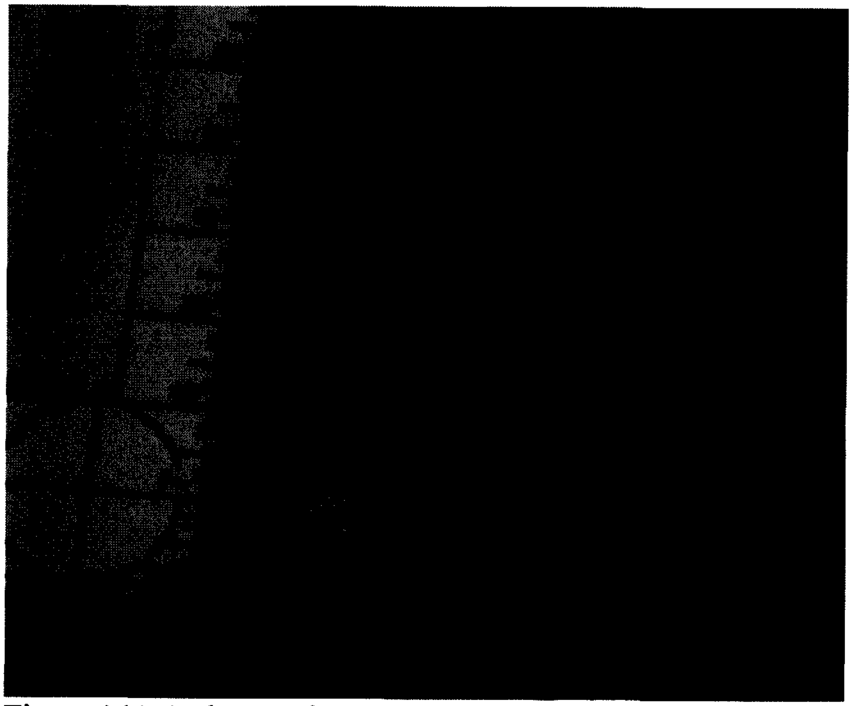

Figure 4.93 A close-up image of the proximal one-fourth of the left femur of pig #5 (cranial view). Note the shades of black, grey, blue and white bone present due to heavy charring and calcination.

The second greatest intensity of thermal damage in the trunk and posterior regions was characterized by charring that extended, in both anterior and posterior directions, from the pelvic girdle region. In the anterior direction, this included charring present on the sternal end of several lower left ribs and the posterior articular processes of the fourteenth and fifteenth thoracic vertebrae (Figure 4.94 to 4.95). In the posterior direction, this included charring present on the proximal ends of both femoral metaphyses, the circumference of the left femoral shaft excluding its lateral aspect, the left patella, the proximal epiphysis and cranio-medial aspect of the left tibial metaphysis, the proximal epiphysis and crest of the right tibia, the shafts of both right and left fibulae, and the proximal ends of the third and fourth left metatarsals (Figure 4.96 to

4.106). It is important to note that the duration and intensity of the two localized fires caused modifications to the structural integrity of several skeletal elements. Consequently, their fragile and compromised skeletal structures were susceptible to post mortem breaks, fractures, and the removal of cortical bone.

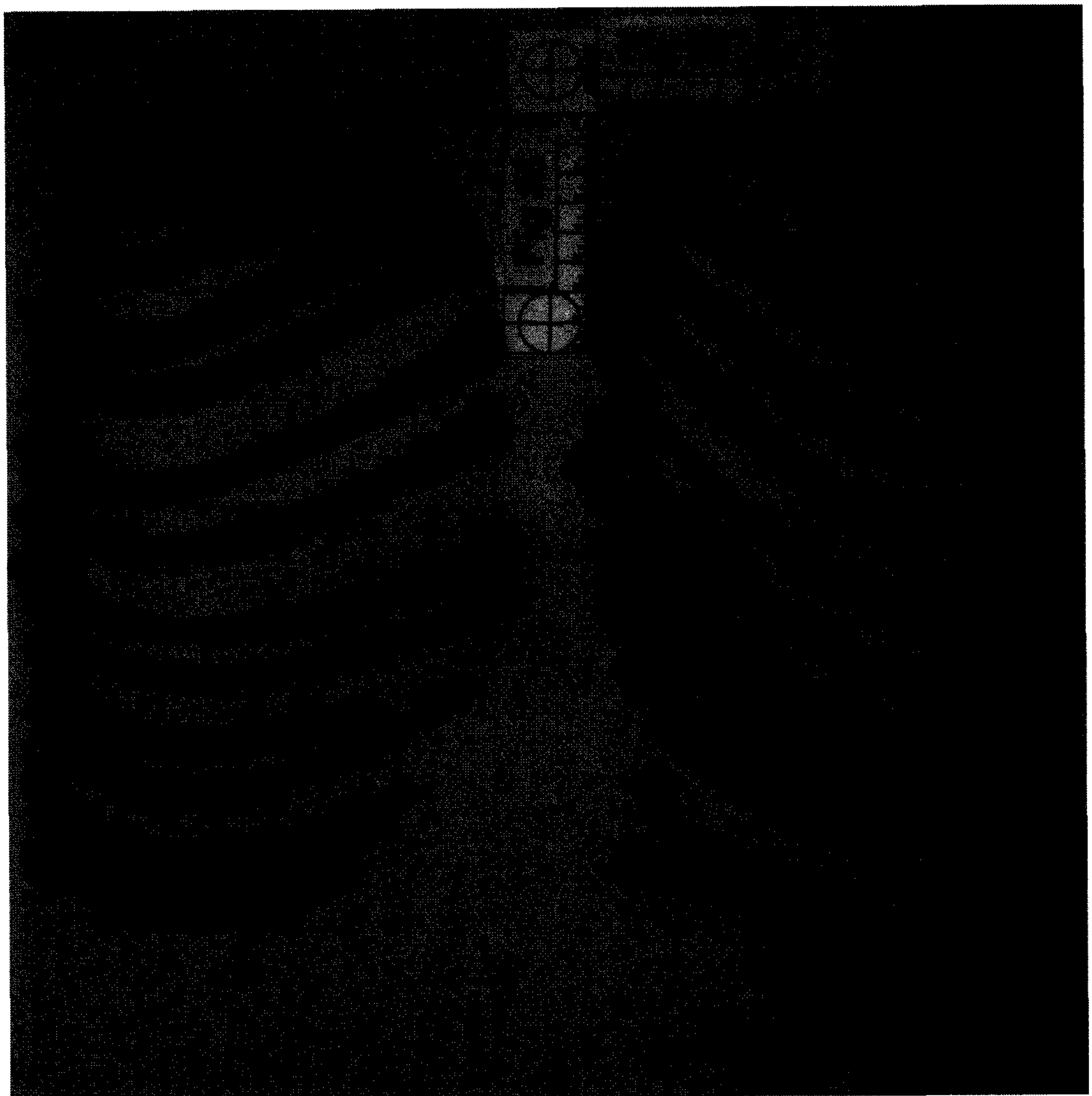

Figure 4.94 An overall image of the ribs of pig #5 (ventral view). Note the charring and calcination primarily present on the sterna end of the lower left ribs.

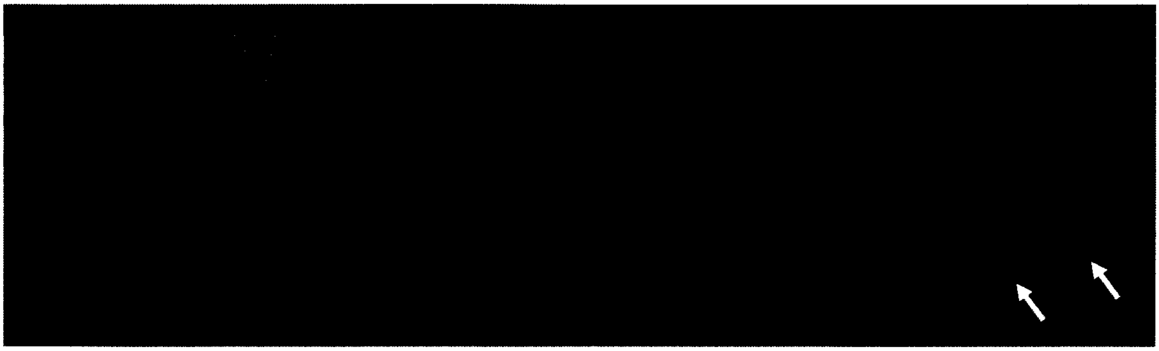

Figure 4.95 An overall image of the left lateral aspect of the thoracic ribs of pig #5. Note the charring present on the posterior articular processes of thoracic vertebrae #14 and #15 (yellow arrows).

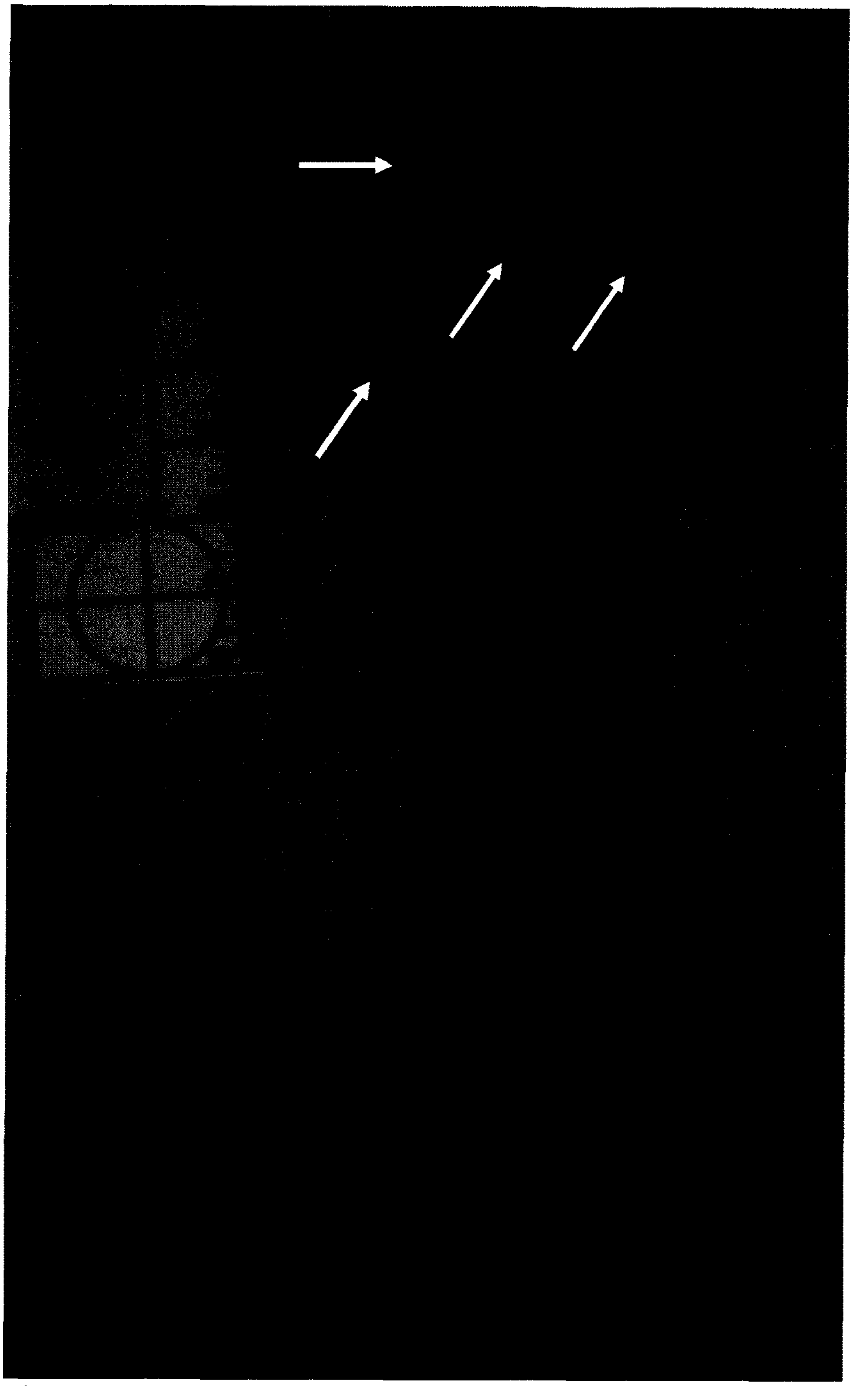

Figure 4.96 A mid-range image of the right femur of pig #5 (cranial view). Note the post mortem removal of cortical bone from the proximal one-fourth of the metaphysis and the proximal epiphysis (yellow arrows).

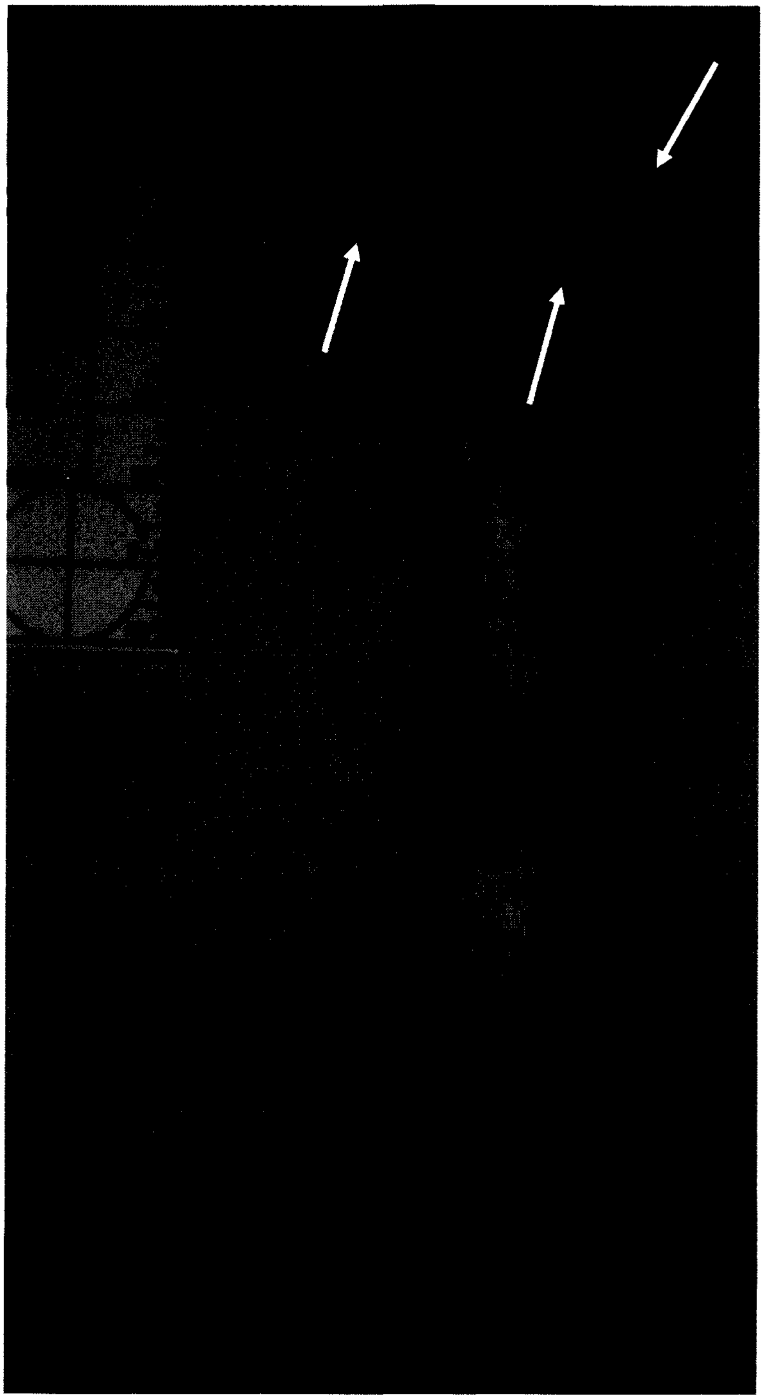

Figure 4.97 A mid-range image of the right femur of pig #5 (caudal view). Note the post mortem removal of cortical bone from the proximal one-fourth of the metaphysis and the proximal epiphysis (yellow arrows).

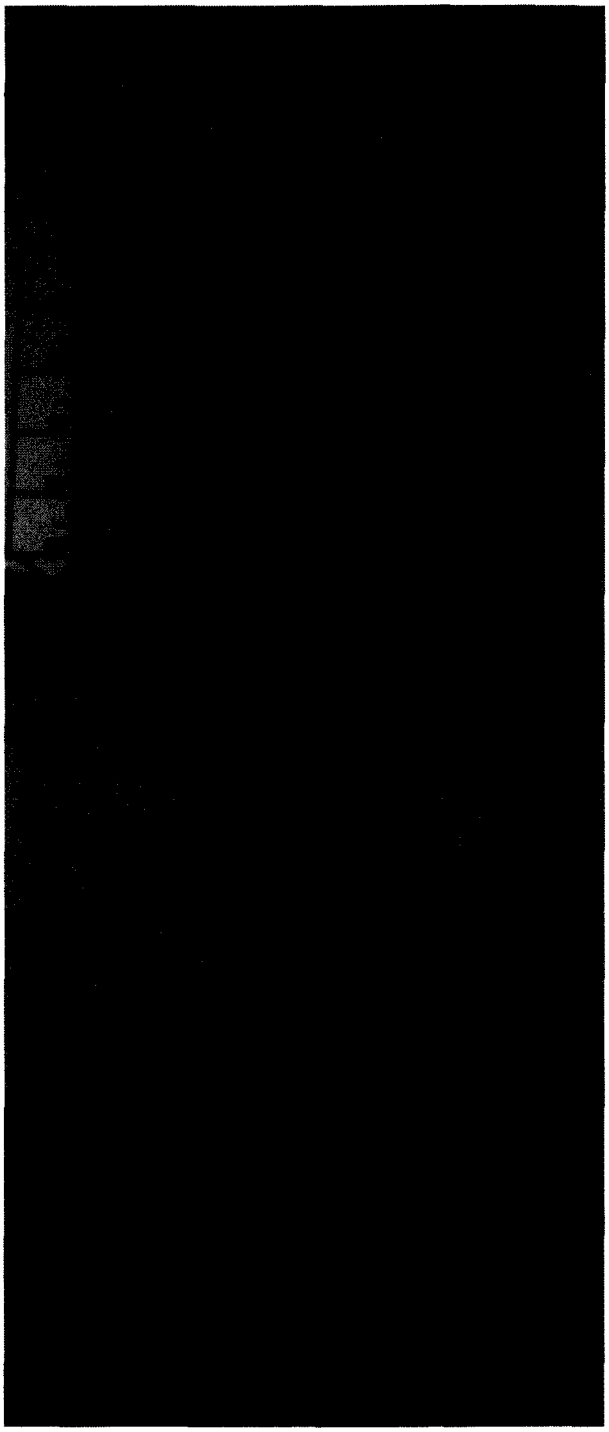

Figure 4.98 A mid-range view of the left femur of pig #5 (cranial view). Note the heavy charring and calcination present on the proximal and distal end of the metaphysis and on the epiphyses.

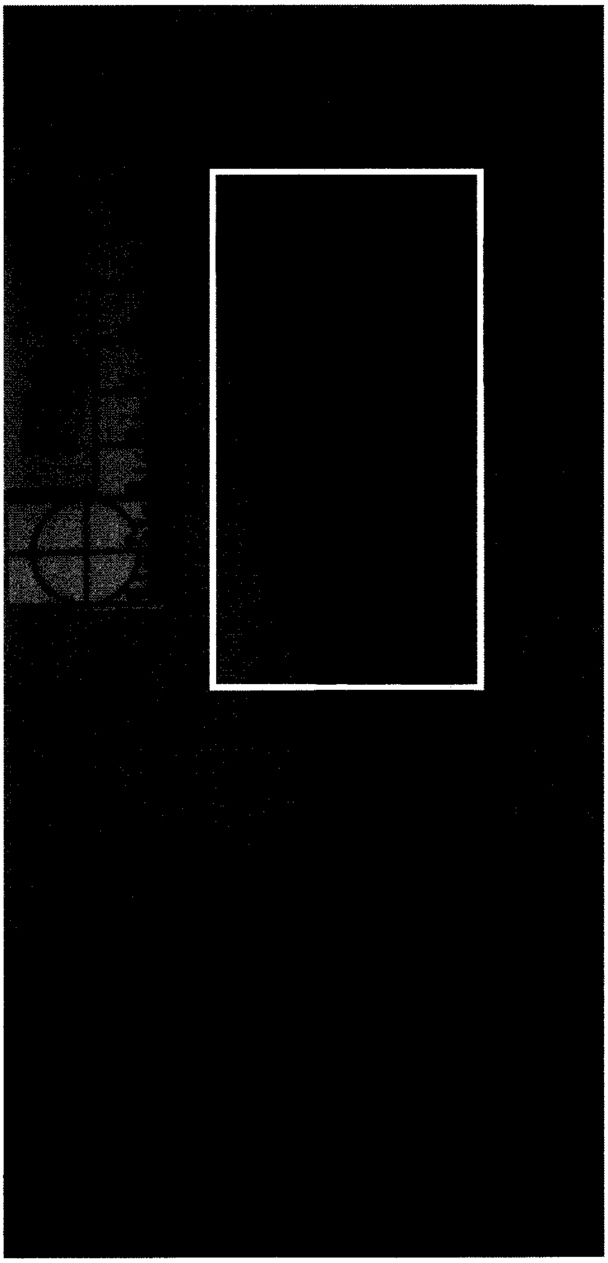

Figure 4.99 A mid-range view of the left femur of pig #5 (medial view). Note the post mortem damage fractures and breaks in the metaphysis due to heavy charring which compromised the structure of the bone. Also, note the black, grey, blue, and white

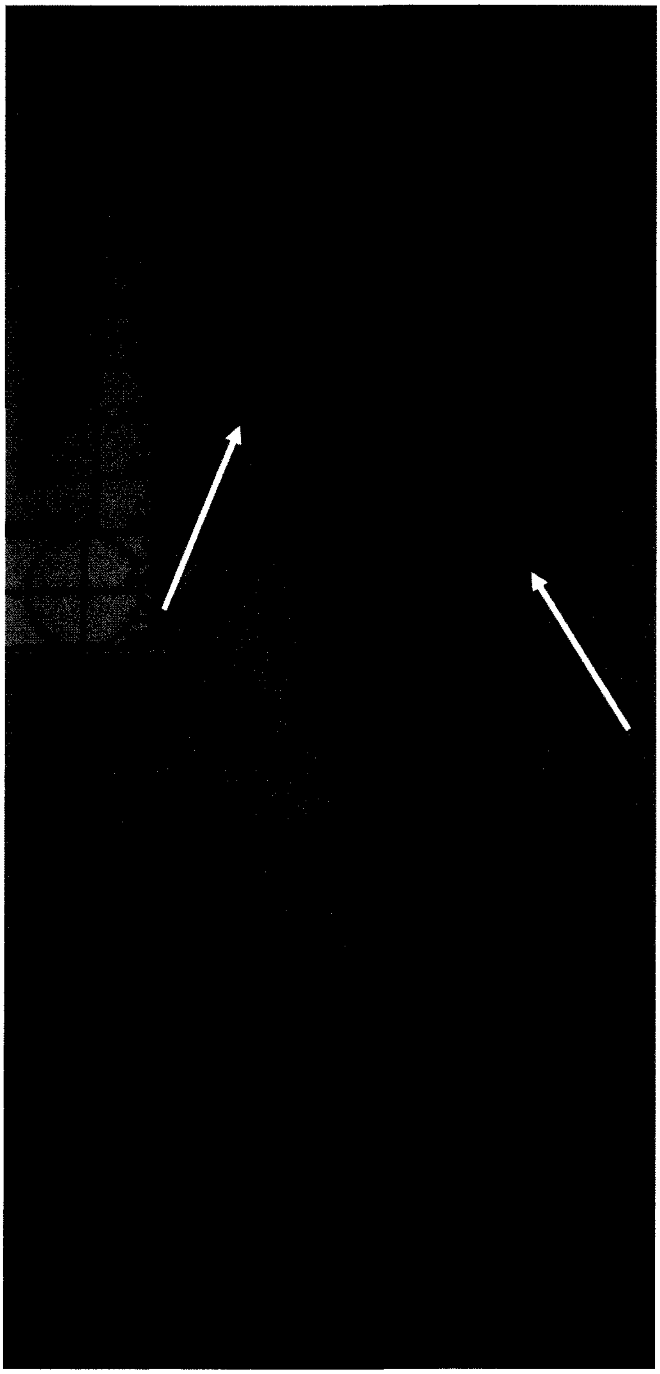

Figure 4.100 A mid-range view of the left femur of pig #5 (caudo-medial view). Note the black, grey, blue, and white shades of bone present in the neck region and the head epiphysis (yellow arrows).

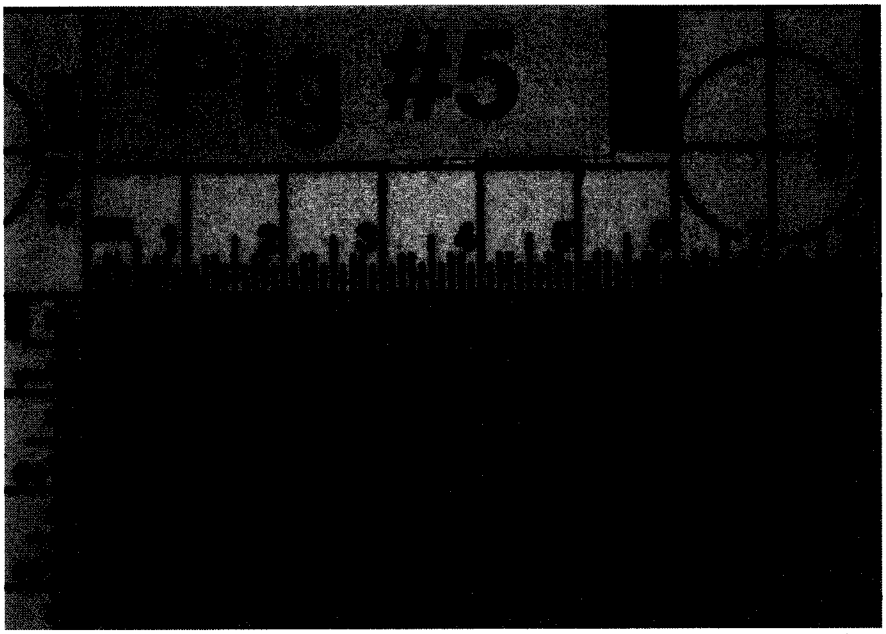

Figure 4.101 A mid-range image of the patellae of pig #5. Note the charring and calcination present on the left patella.

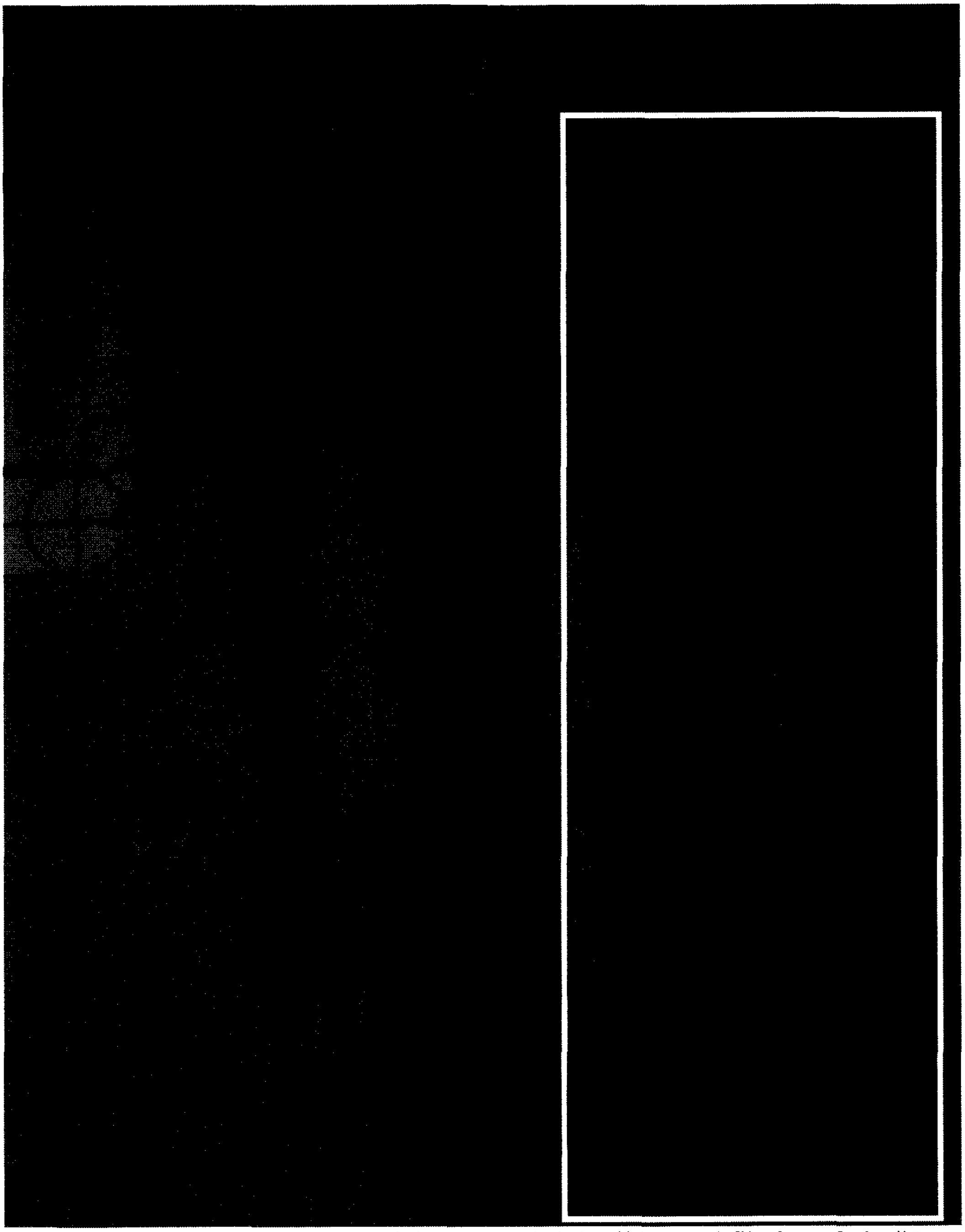

Figure 4.102 An overall image of the left and right tibiae and fibulae of pig #5 (cranial view). Note that there is more extensive thermal damage present on the left tibia and fibula (yellow rectangle).

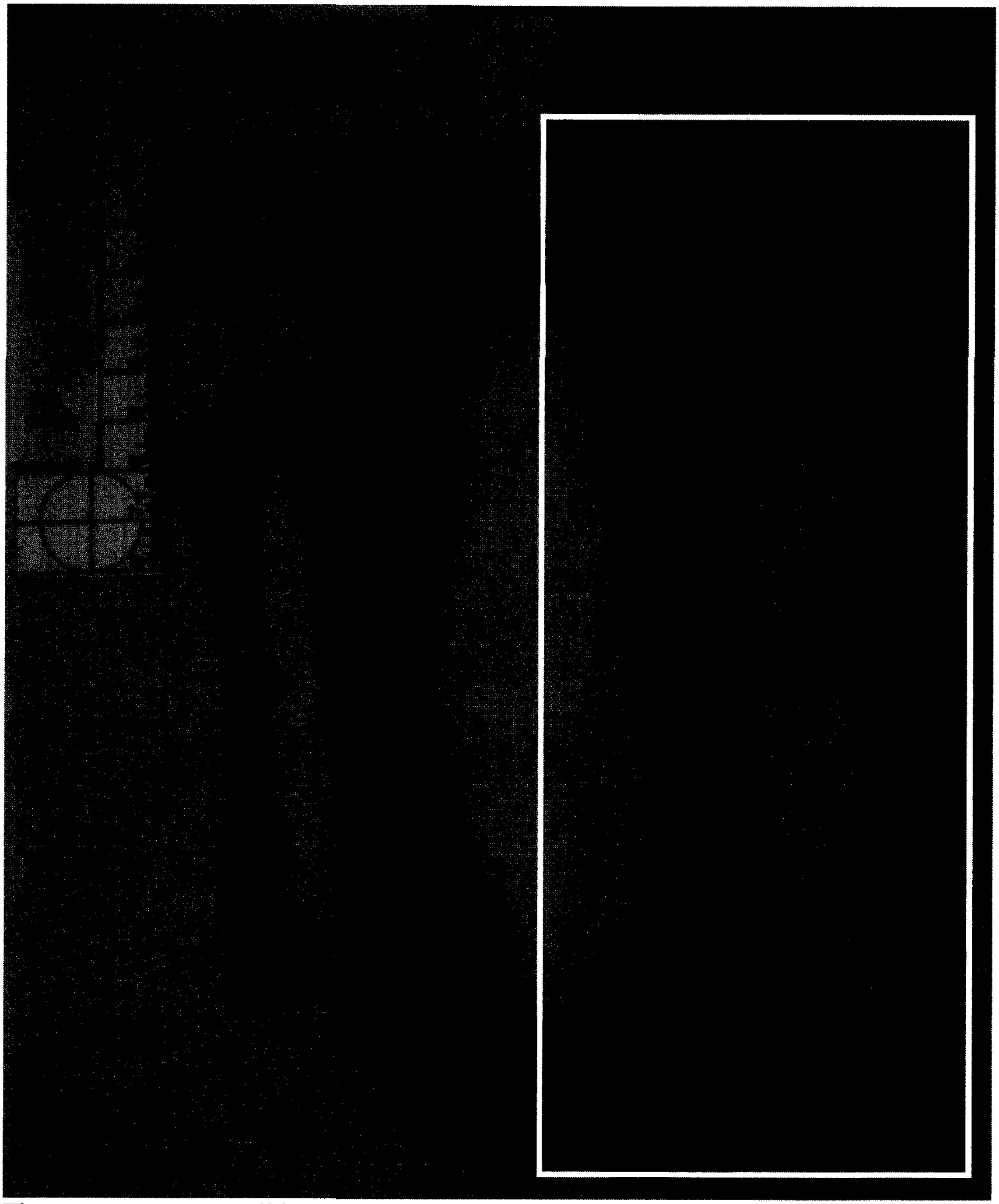

Figure 4.103 An overall image of the left and right tibiae and fibulae of pig #5 (caudal view). Note the more extensive thermal damage present on the left tibia and fibula (yellow rectangle).

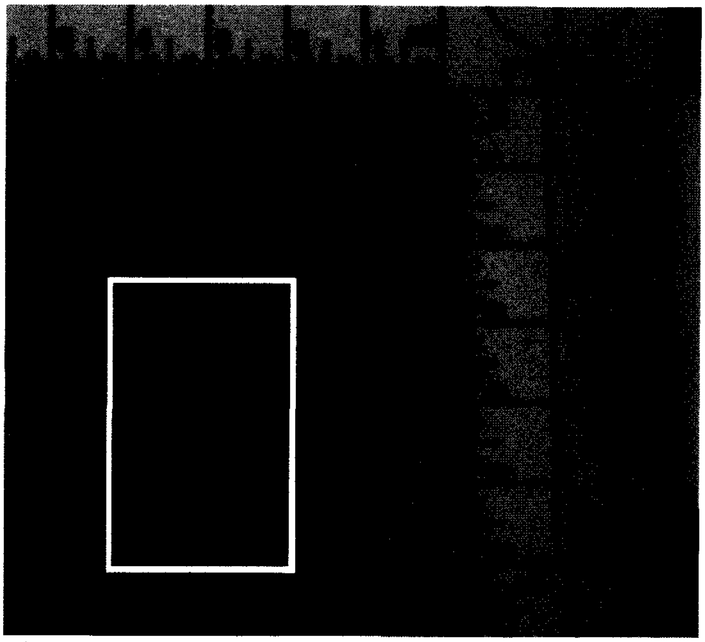

Figure 4.104 A close-up image of the proximal one-fourth of the left tibia of pig #5 (cranial view). Fragile cortical bone on the tibial crest (yellow rectangle) was removed post mortem.

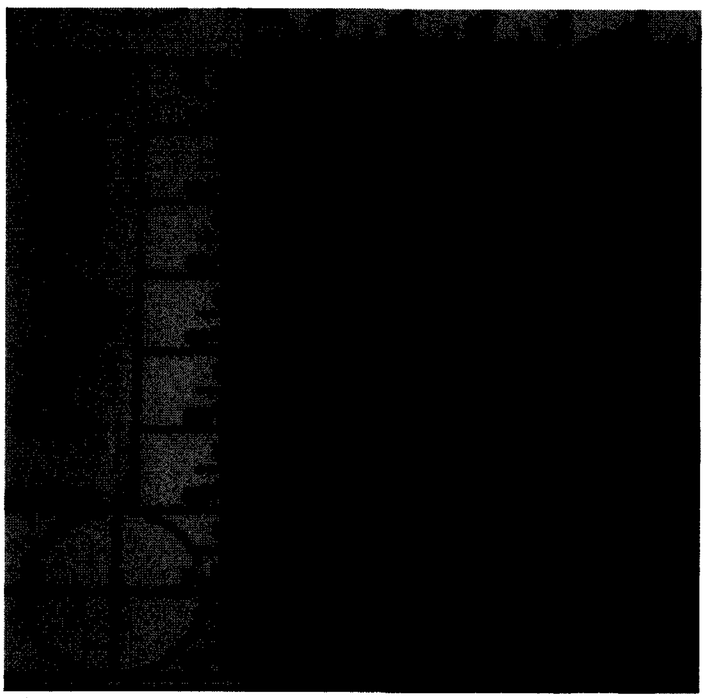

Figure 4.105 A close-up image of the proximal one-fourth of the left tibia of pig #5 (caudal view).

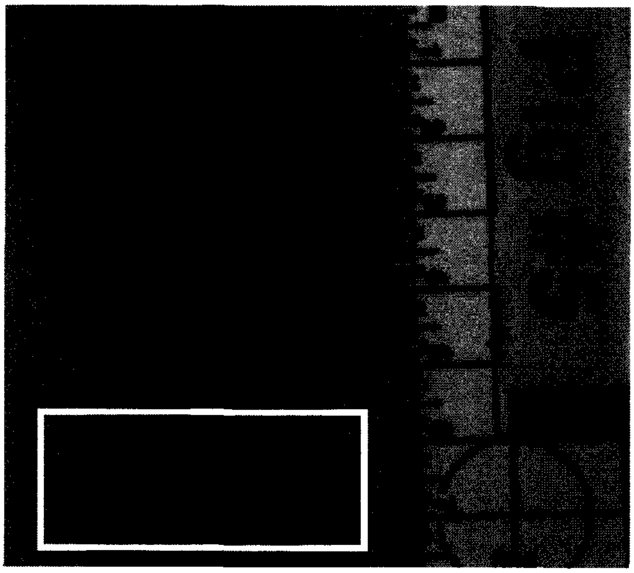

Figure 4.106 A mid-range image of the 3rd and 4th left metatarsals of pig #5 (order undetermined due to post mortem damage at distal end; dorsal view). Note that charring present on the proximal ends of the bone made it susceptible to post-mortem damage (yellow rectangle).

4.3.3.2. Thermal damages to the skeletal remains of pig #6

The heat-related skeletal trauma present on pig #6 was highly concentrated in the trunk region (Figures 4.107 to 4.109). This included thermal injuries to more than 75% of the surface of the scapulae, the cervical and thoracic vertebrae, and the ribs. On the lateral surface of the right scapula, charring was present on the infraspinous fossa and it lined the posterior border to the glenoid cavity. Medially, charring and calcination covered the inferior one-third of the subscapular fossa from the glenoid cavity to the medial scapular border. Similar thermal injuries were present on the left scapula, as illustrated on the subscapular fossa, tuber scapulae, and the medial border (Figures 4.110 to 4. 114).

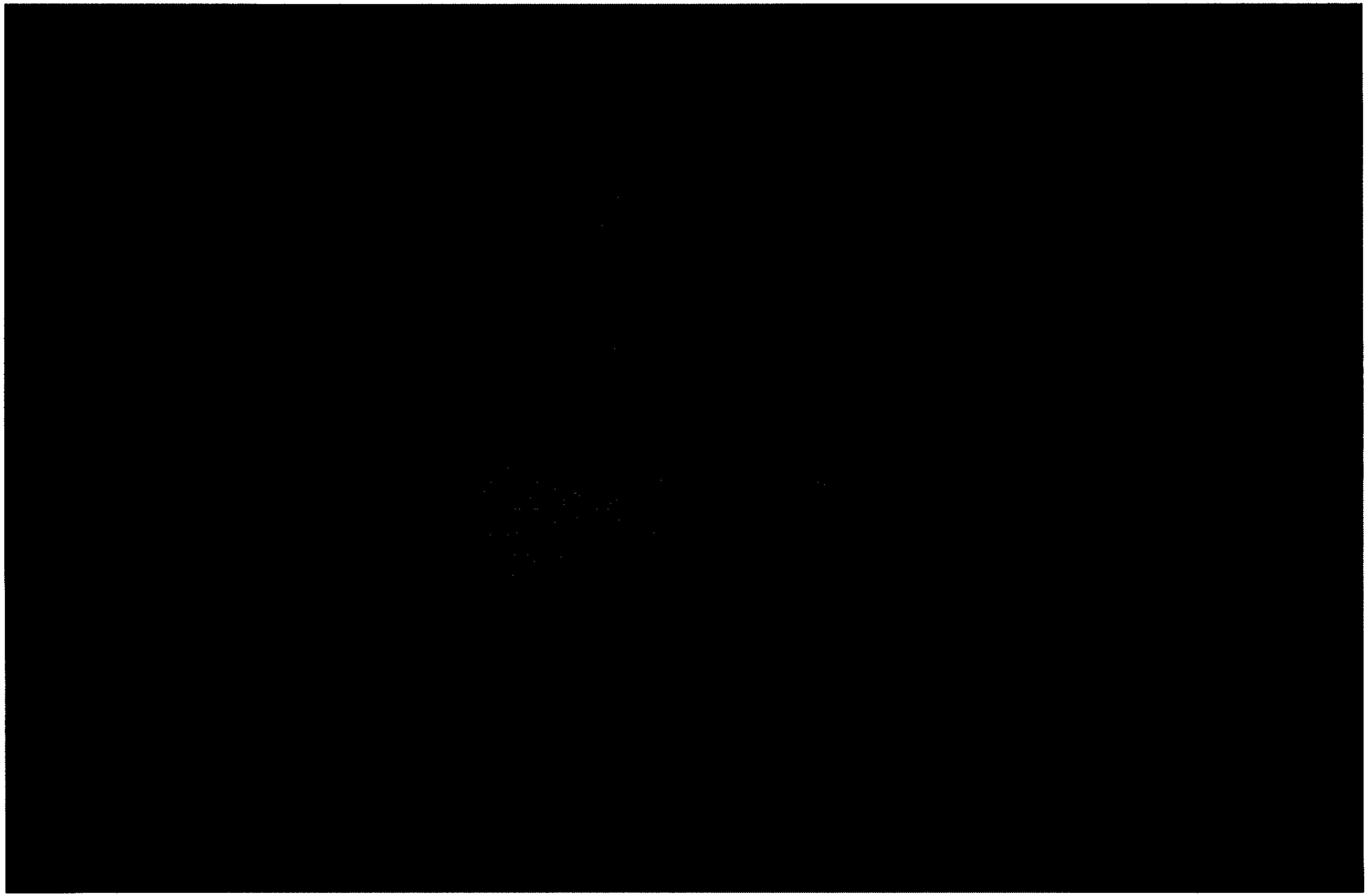

Figure 4.107 A mid-range image, of the skeletal remains of pig #6, displaying evidence of extensive charring and calcination (overview of the cranial and trunk regions).

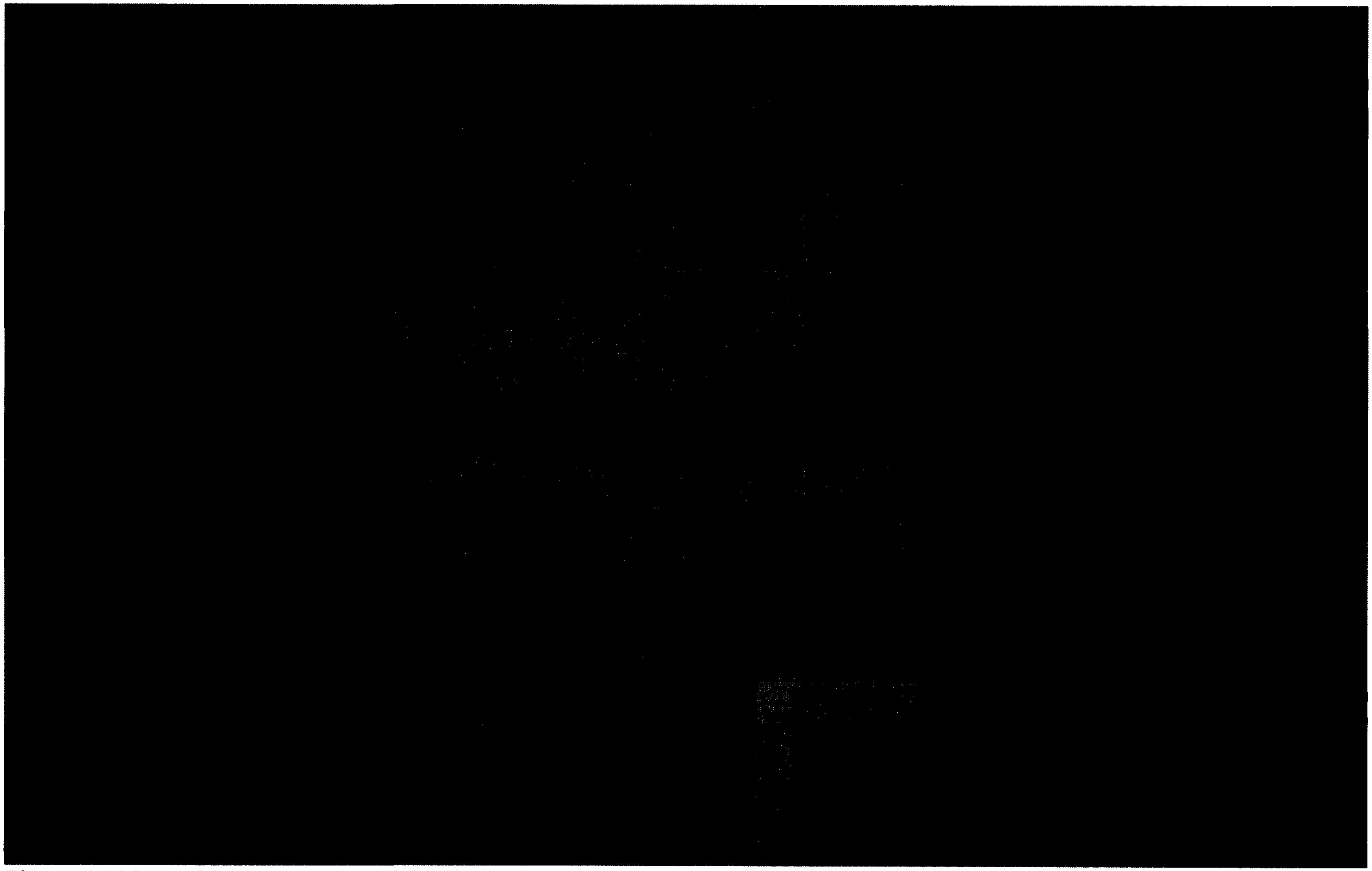

Figure 4.108 A mid-range image, of the skeletal remains of pig #6, displaying evidence of extensive charring and calcination (overview of the trunk region of pig #6).

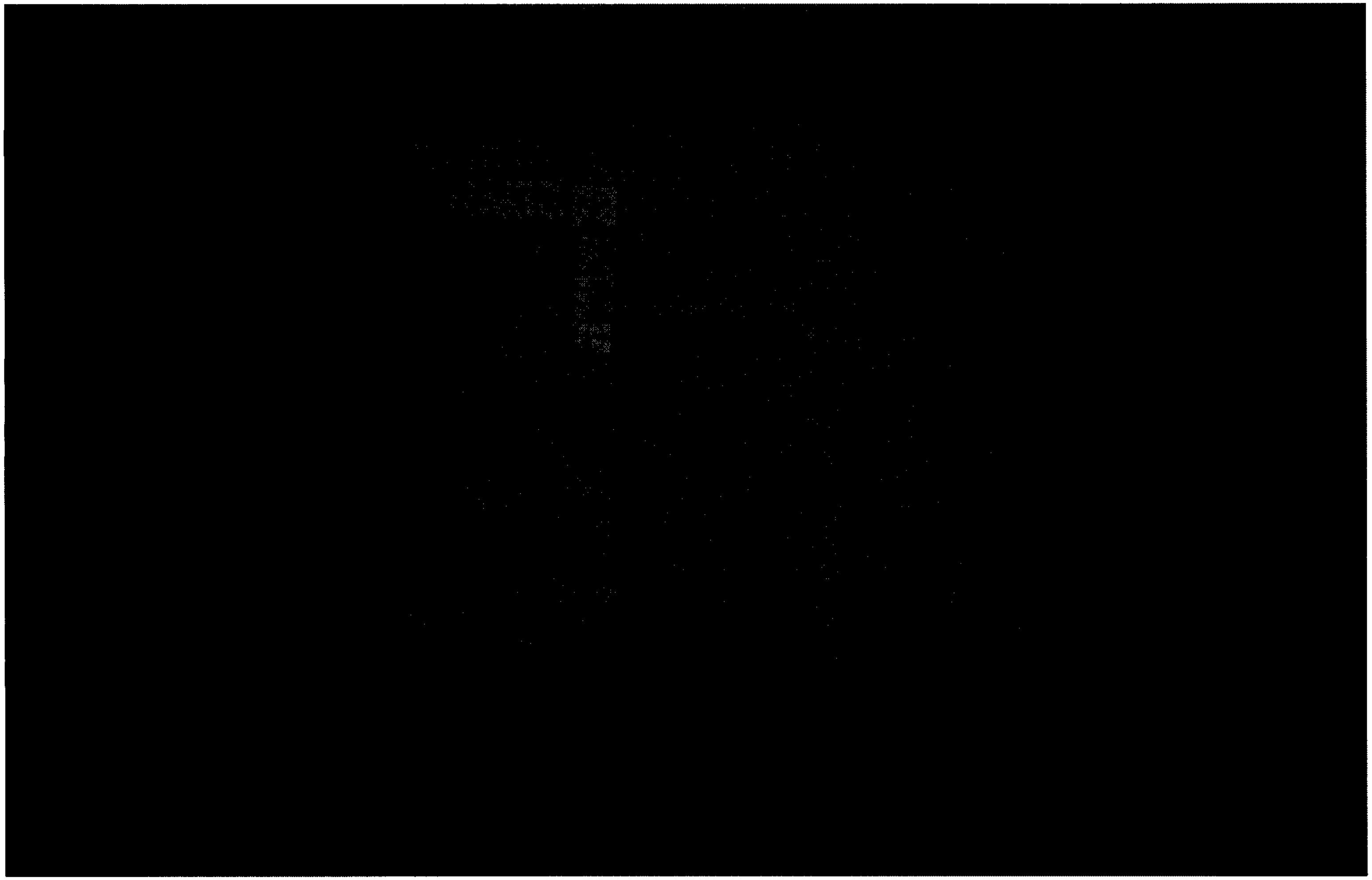

Figure 4.109 A mid-range image, of the skeletal remains of pig #6, displaying moderate evidence of charring and calcination (overview of the caudal region of pig #6).

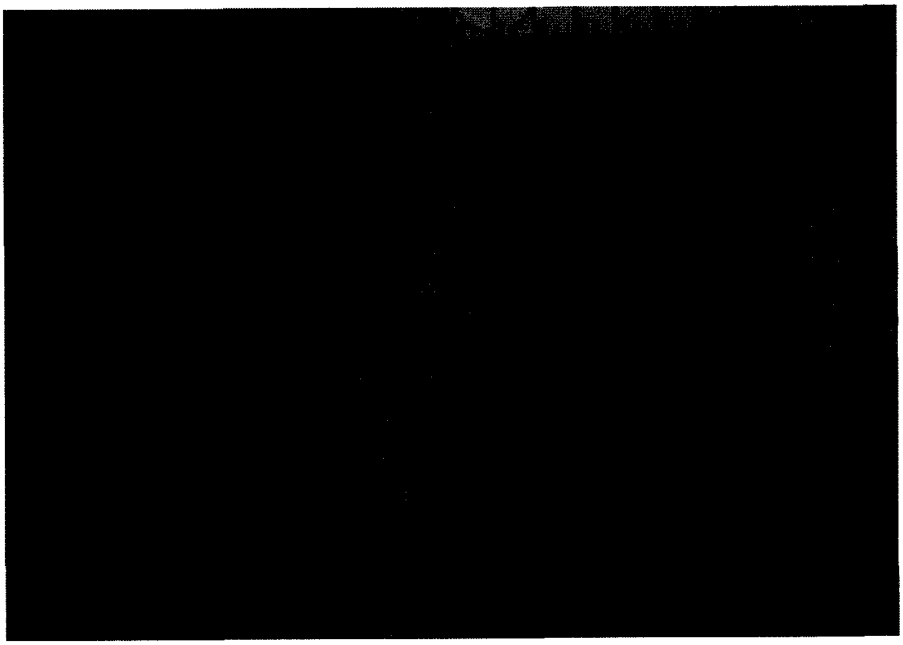

Figure 4.110 A mid-range image of the right and left scapulae of pig #6, displaying varying degrees of charring and calcination (lateral view).

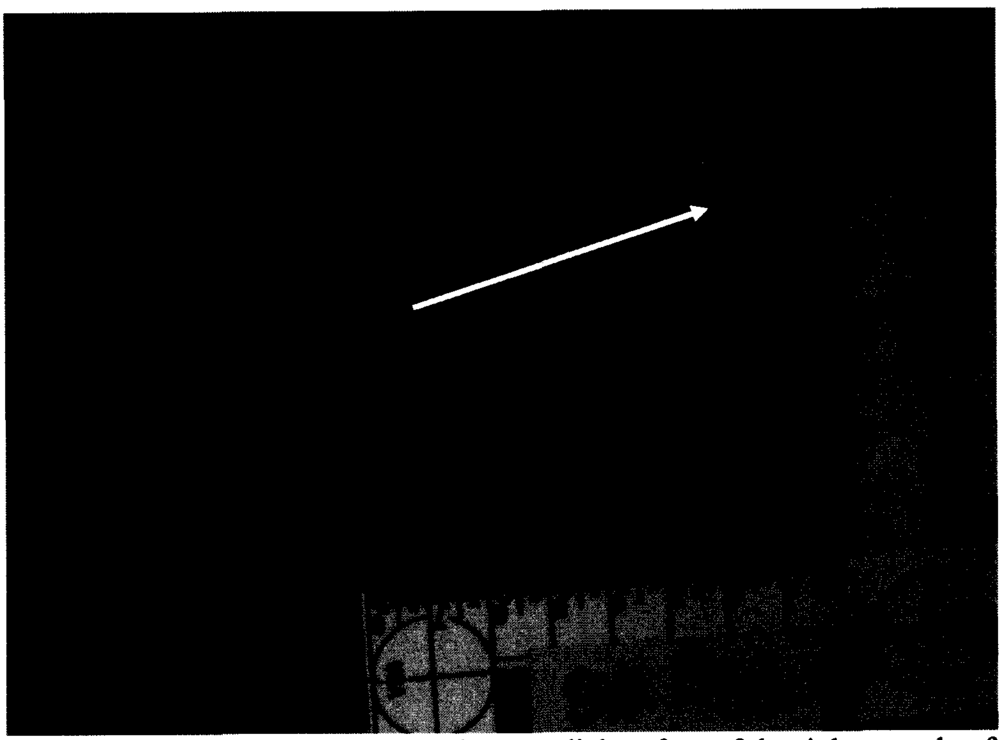

Figure 4.111 A mid-range image of the medial surface of the right scapula of pig #6. Note the post mortem damage to the subscapular fossa due to the thermal damage (yellow arrow).

Figure 4.112 A mid-range image of the charring and calcination on the glenoid cavity of the right scapula of pig #6.

Figure 4.113 A mid-range image of the medial surface of the left scapula of pig #6. Note the extensive post mortem damage due to the heavy degree of charring and calcination.

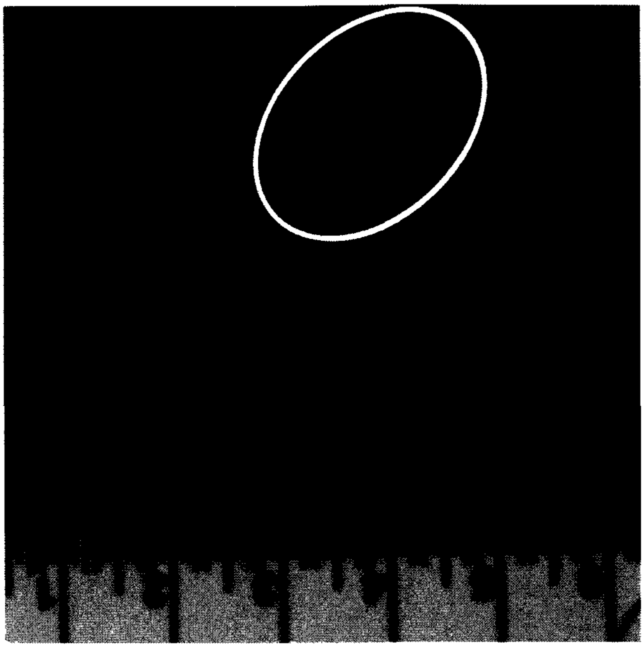

Figure 4.114 A mid-range image of the charring and calcination on the tuber scapulae (yellow circle) and medial border of the left glenoid cavity of pig #6.

Extensive thermal injuries were present on the vertebral column from the cervical to sacral vertebrae. Charring and calcination were evident on the fourth cervical vertebrae to the fifteenth thoracic vertebrae while moderate charring extended from the lumbar to sacral vertebrae (Figures 4.115 to 4.117). Shades of black, grey, and blue were present on the entire surface of the cervical and thoracic region indicative of exposure to temperatures above 650 °C (Bonucci and Graziani 1975; Munro et al. 2007; Shipman et al. 1984). The ribs experienced similar thermal injuries as the cervical and thoracic vertebrae although the body of several upper right ribs remained unburned. These upper right ribs were afforded protection from direct contact with the fire because of the sequence of disarticulation of pig #5. The left ribs and thoracic vertebrae collapsed on top of the right ribs and, thus, provided protection from the fire (Figures 4.118 to 4.121).

Figure 4.115 An overall image of the gradient of moderate to heavy charring and calcination observed on the cervical to lumbar vertebrae of pig #6 (left to right, left lateral view).

Figure 4.116 A mid-range image of the extensive charring and calcination present on the thoracic vertebrae of pig #6 (left lateral view). Note the post mortem damage to the spinous processes of the first and third thoracic vertebrae (yellow arrows).

Figure 4.117 A mid-range image of the extensive charring and calcination present on the thoracic vertebrae of pig #6 (right lateral view).

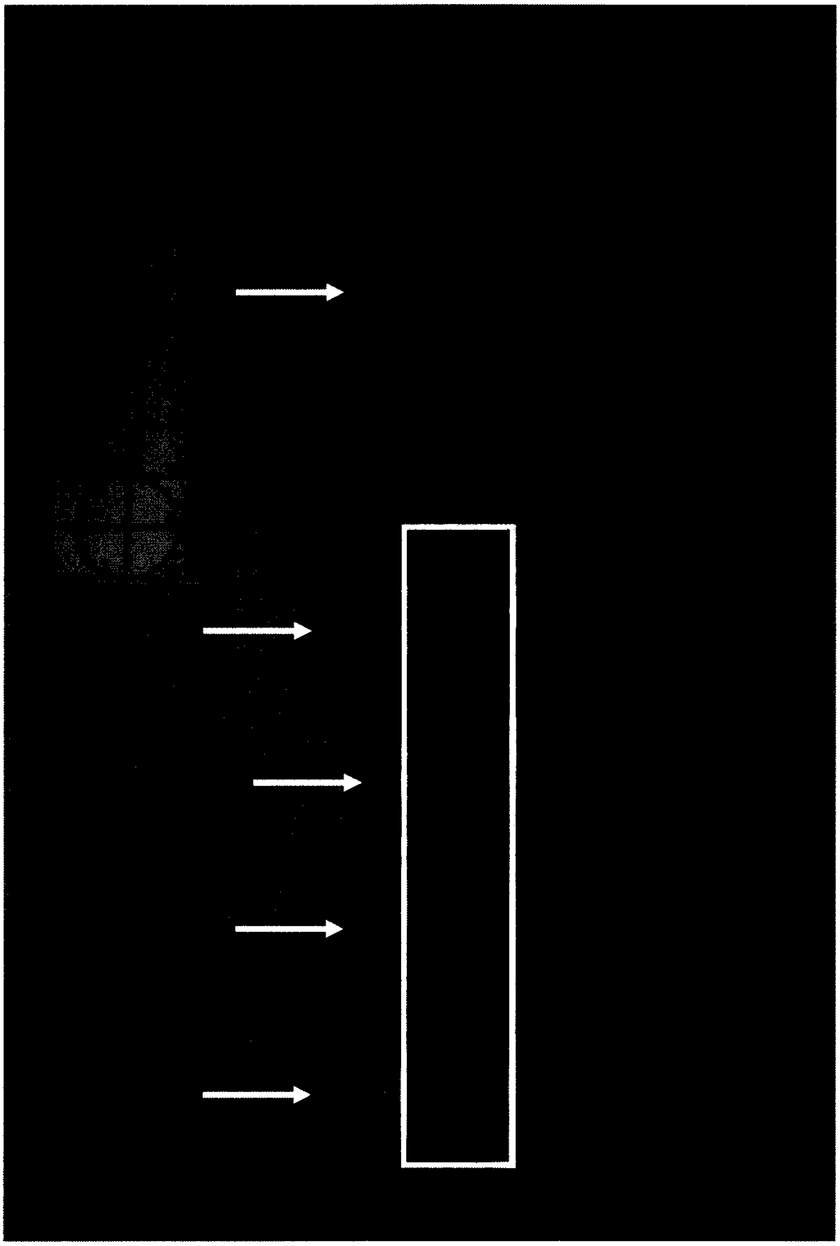

Figure 4.118 A mid-range image of the heavy charring present on the transverse processes, spinous processes, and the superior and inferior articular facets of the lumbar vertebrae of pig #6 (dorsal view). Note many of the left lateral transverse processes (yellow arrows) and spinous processes (yellow rectangle) were broken post mortem.

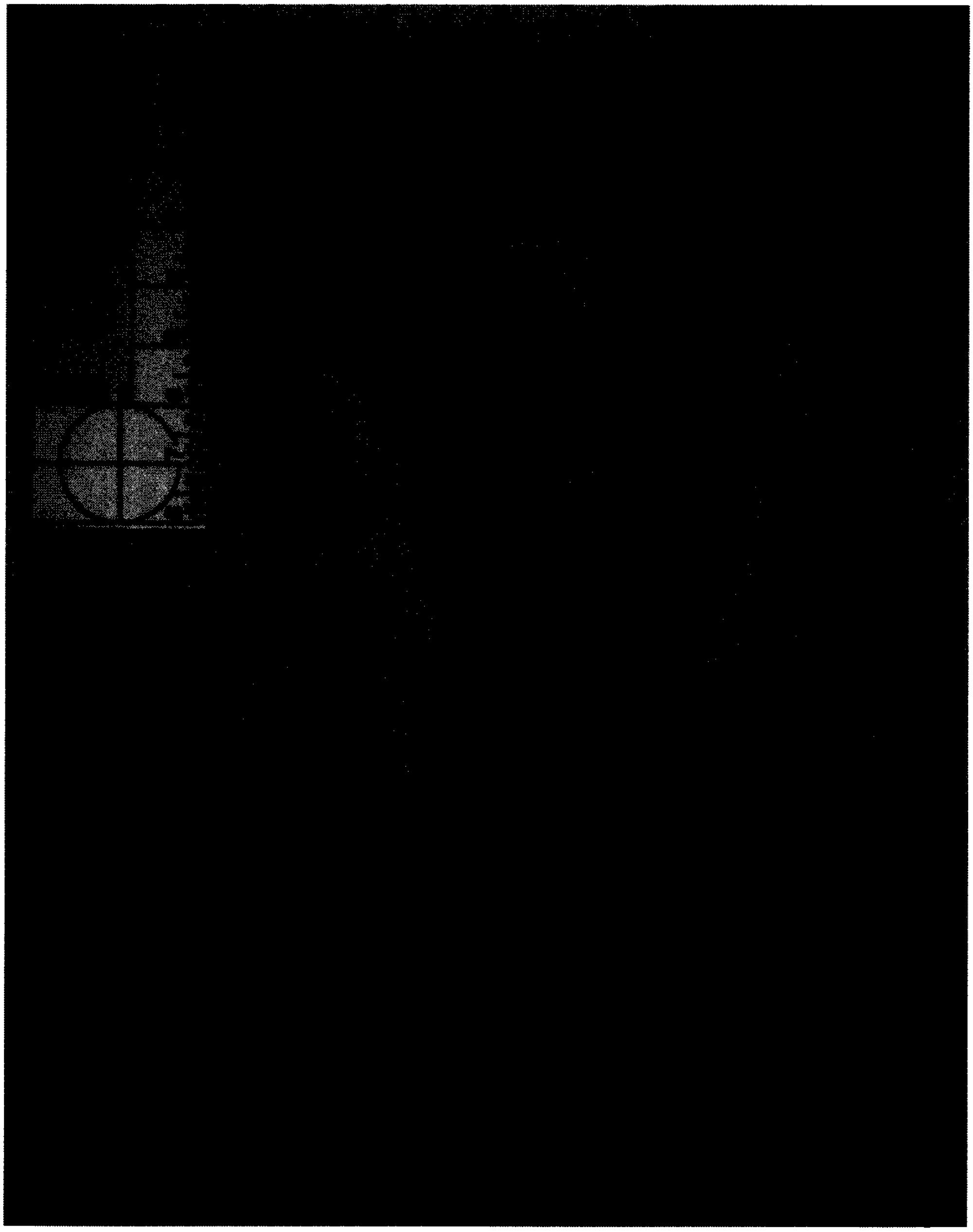

Figure 4.119 A mid-range view of the sacral vertebrae of pig #6. Note the minimal amount of charring and calcination present only on the dorsal surface.

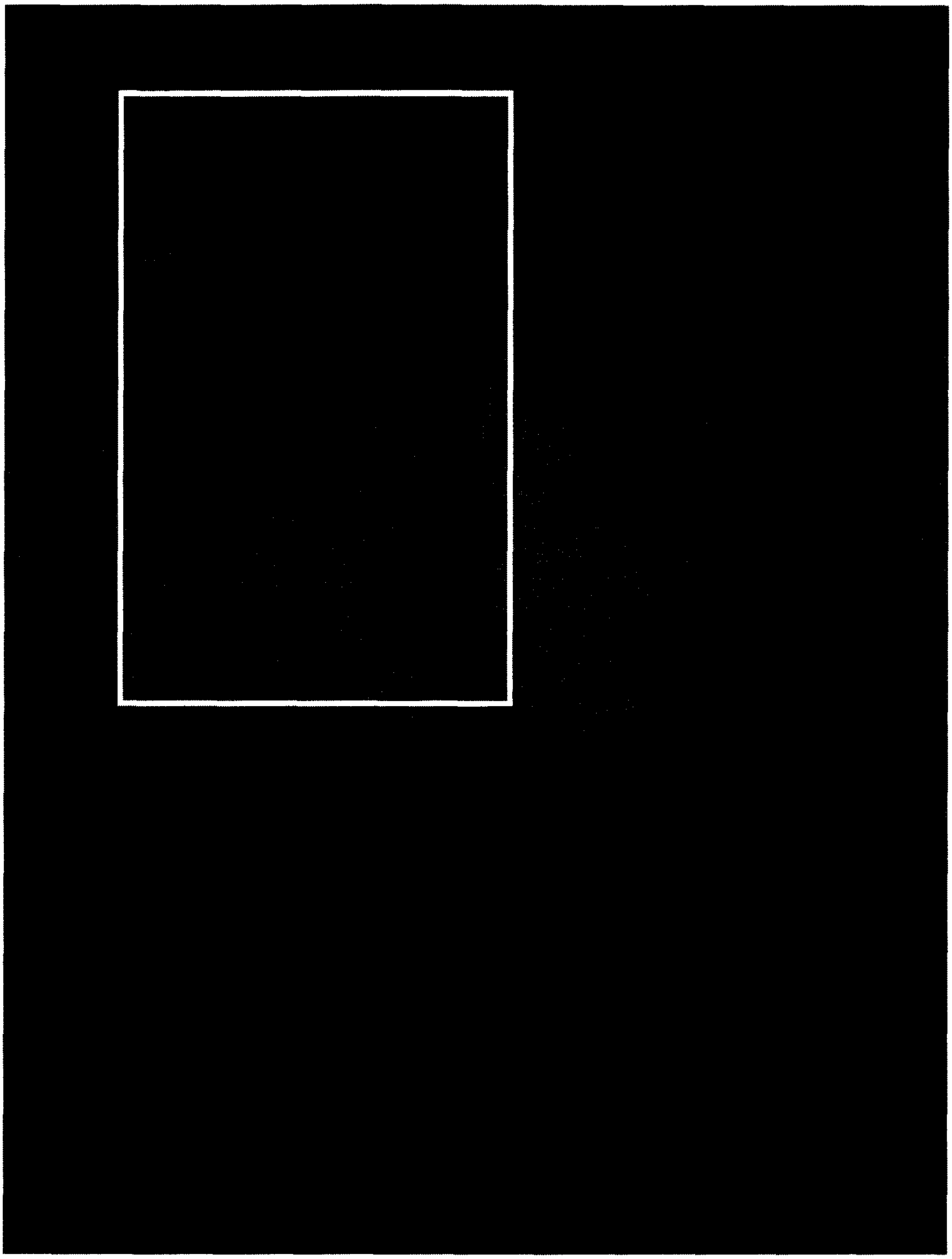

Figure 4.120 An overall image of the right and left ribs of pig #6 (lateral view). Note the extensive charring and calcination which made the ribs more susceptible to post mortem damage. Also note several right ribs were protected from thermal damage with minimal damages present on the sterna or costal ends (yellow rectangle).

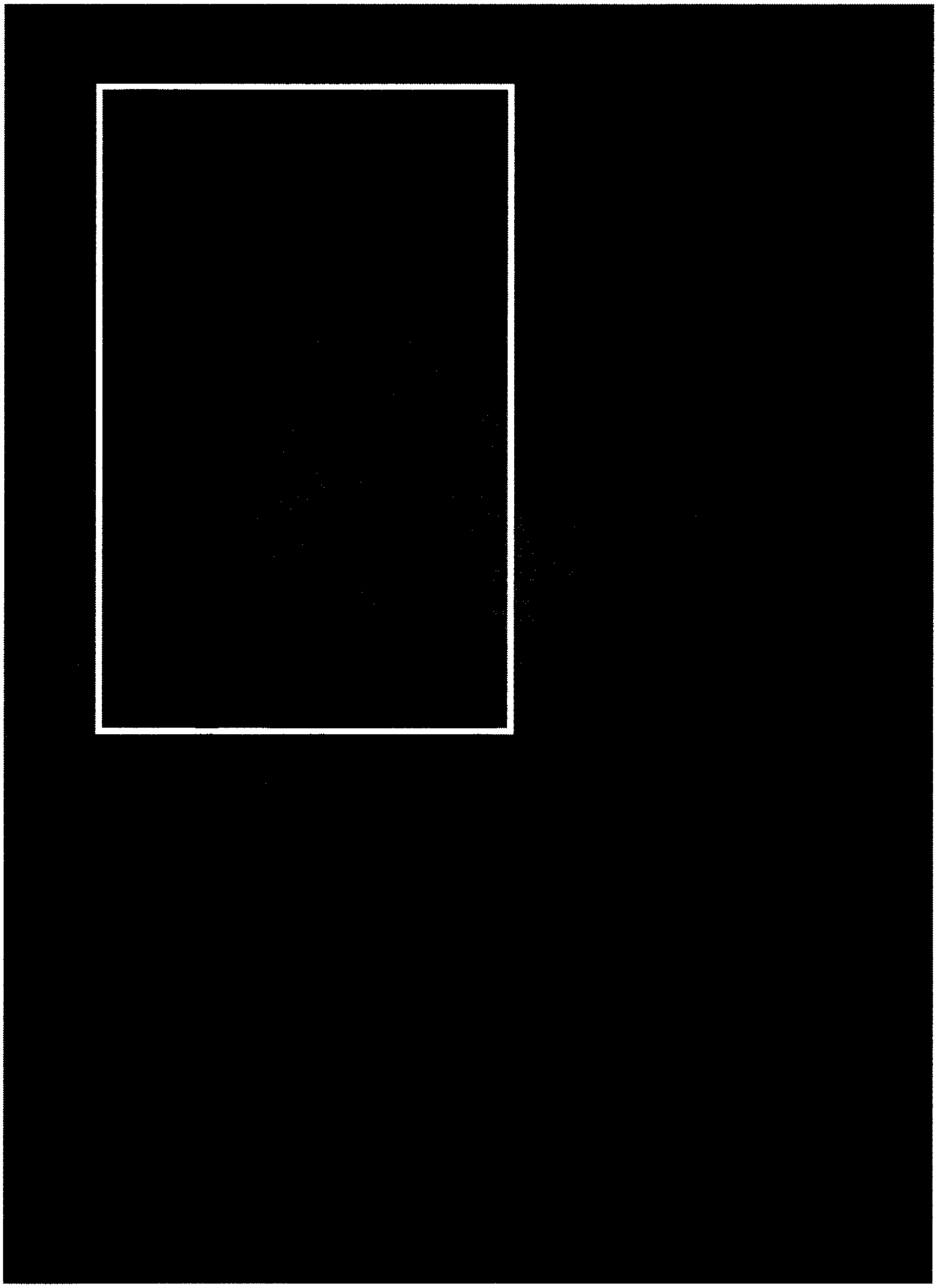

Figure 4.121 An overall image of the right and left ribs of pig #6 (medial view). Note the extensive charring and calcination which made the ribs more susceptible to post mortem damage. Also note several right ribs were protected from thermal damage with minimal damages present on the sterna or costal ends (yellow rectangle).

Although the primary region of heat-related skeletal trauma was located in the trunk region, moderate charring was expressed throughout the entire body. In the anterior region of pig #5, thermal injuries were observed on the humerii and the skull. Charring on the right humerus was present on the proximal epiphyses, the caudal aspect of the neck, and the distal end of the right metaphysis. On the left humerus, charring was present on the proximal epiphyses, the lateral aspect of the neck, the lateral condyloid crest, and the lateral condyle on the distal end (Figures 4.122 to 4.127). From the cranial to the forelimb region, charring was observed on the left lateral, ventral, and caudal surfaces of the skull. On the left lateral surface of the skull, charring was observed on the premaxilla, the nasal bone, and bordered from the gonial angle to the ascending ramus (Figure 4.128). The left premaxilla was heavily charred on the ventral surface with mild charring extending to the left maxilla, left molars, and the left and right horizontal palatine bones. Calcination was also present, ventrally, on the right and left hamulus, right bulla tympanica, and the right zygomatic process of the malar bone (Figure 4.129). Lastly, on the caudal surface of the skull, charred bone was found on the squamous, lateral and basilar parts of the occipital bone, the squamous portion of the right and left temporal bone, the right and left meatus acusticus externus, the right occipital condyle, and the right paramastoid process (Figure 4.130).

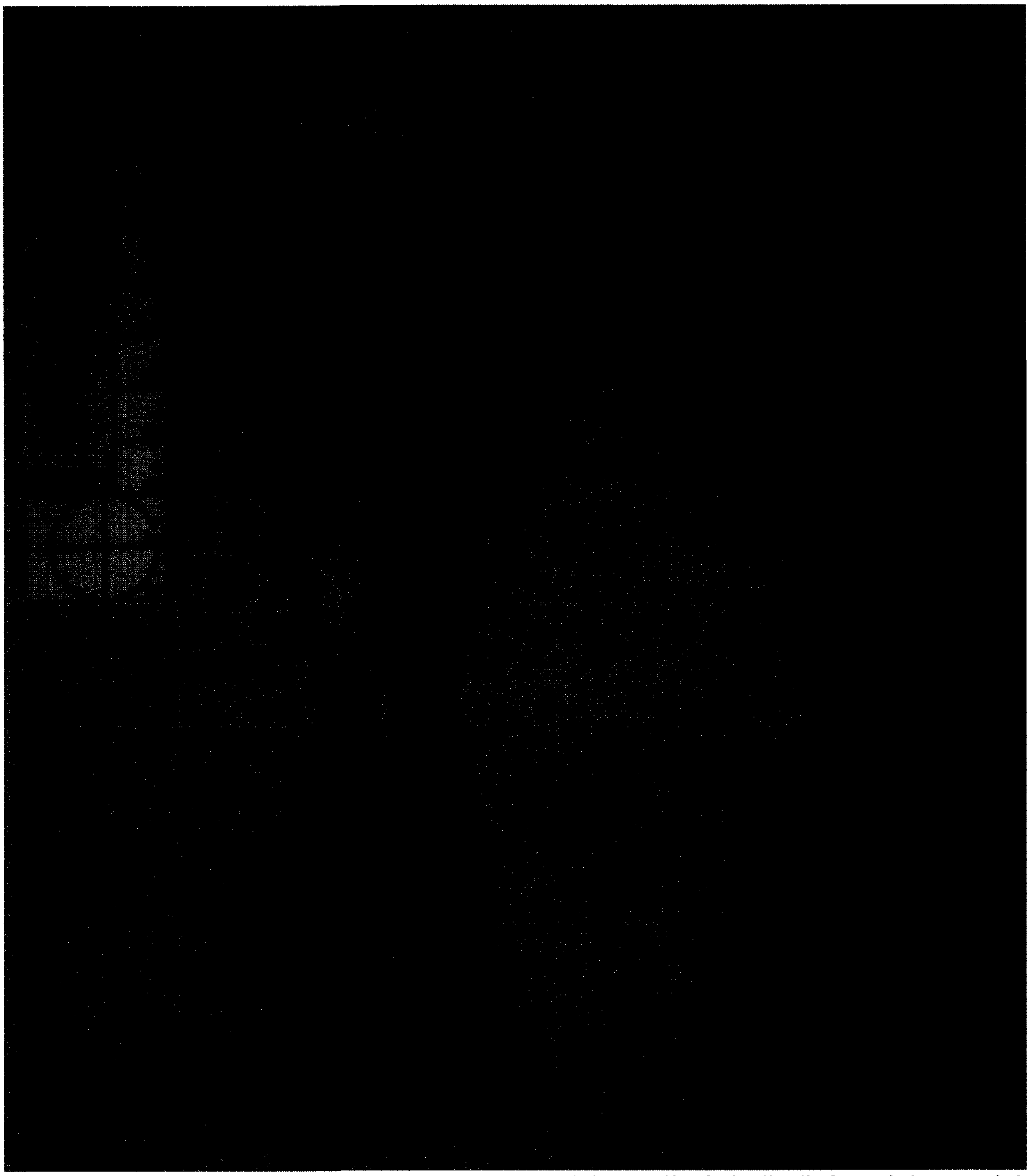

Figure 4.122 An overall image of the right and left humerii of pig #6 (left to right, cranial view). Note the small amount of charring present on the proximal and distal end of each humerii.

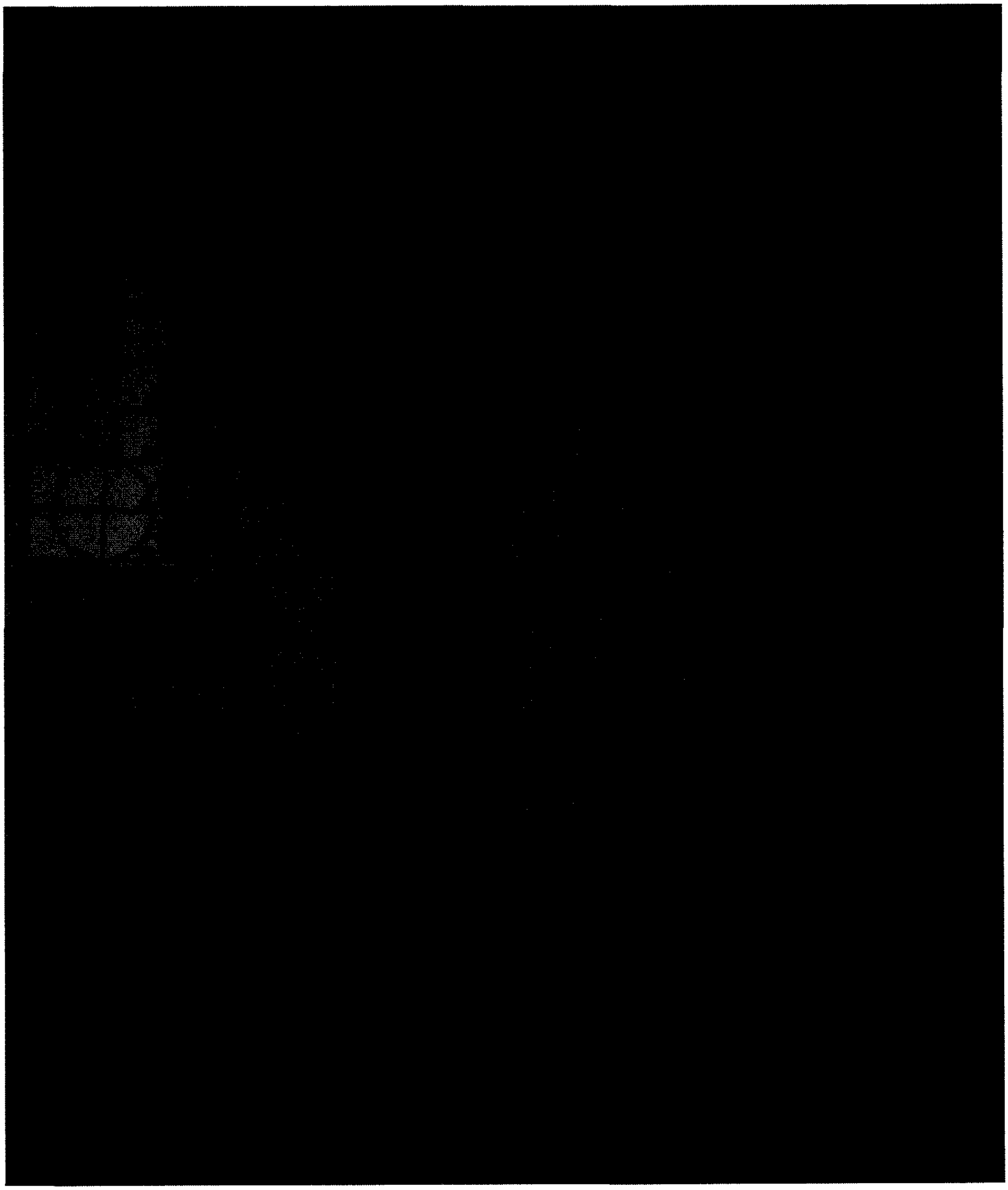

Figure 4.123 An overall image of the right and left humerii of pig #6 (left to right, caudal view). Note the small amount of charring present on the proximal and distal end of each humerii.

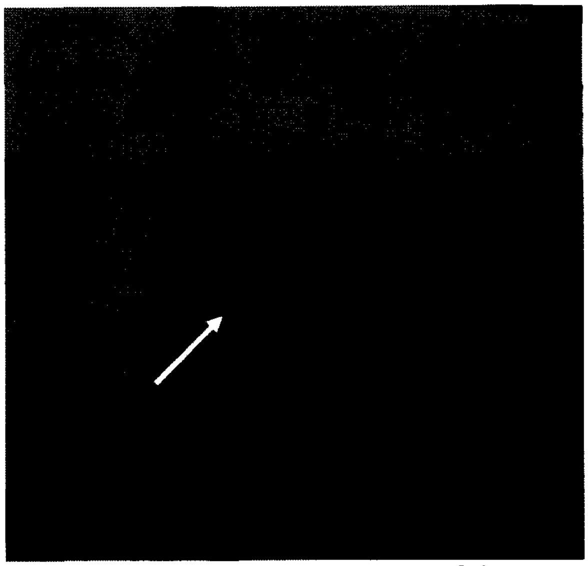

Figure 4.124 A mid-range image of the proximal end of the right humerus of pig #6. Note the removed cortical bone on the surface of the trochanter major (yellow arrow) and head epiphysis (medial view).

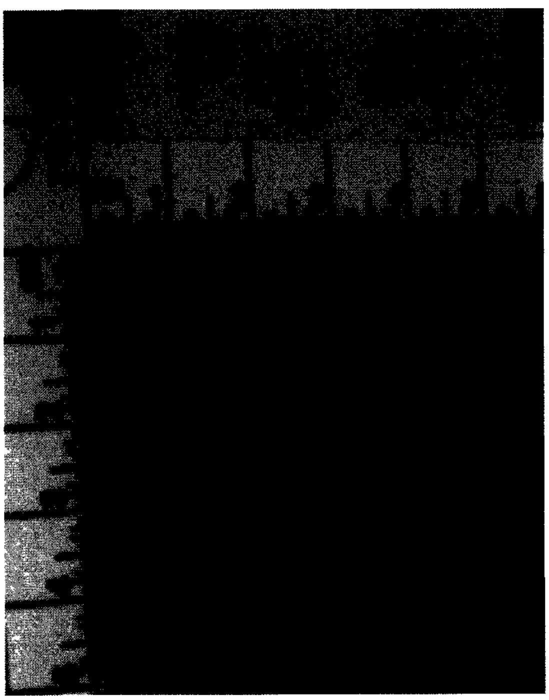

Figure 4.125 A mid-range image of charring and post mortem removal of cortical bone on the distal end of the right humerus of pig #6 (medio-caudal view).

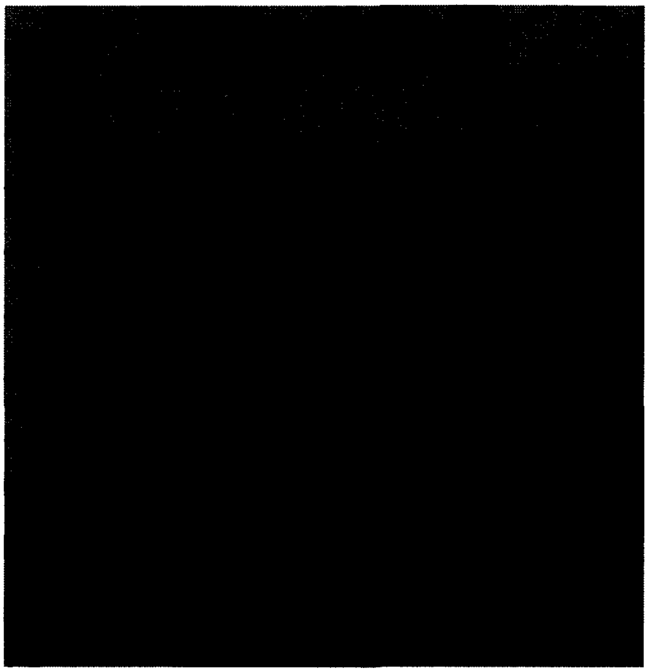

Figure 4.126 A mid-range image of the proximal end of the left humerus of pig #6. Note the cortical bone on the surface of the trochanter major and head epiphysis which was removed post mortem (lateral view).

Figure 4.127 A mid-range image of the distal end of the left humerus of pig #6 (caudal view). Note the cortical bone removed post mortem due to the thermal damages.

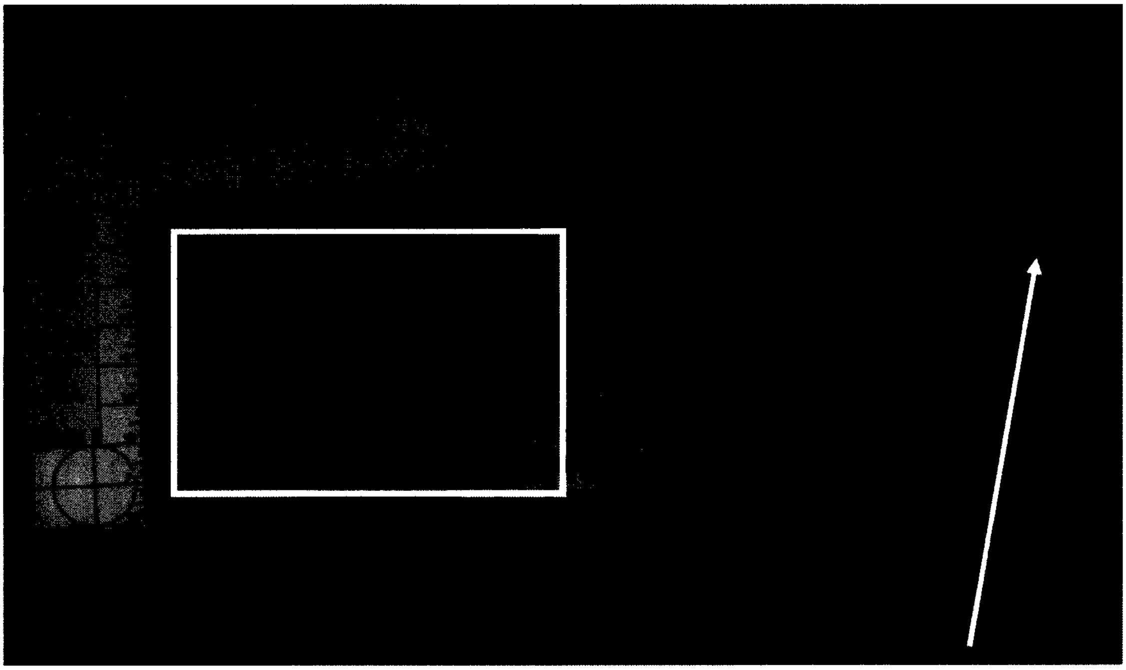

Figure 4.128 A mid-range image of the left lateral aspect of pig #6, displaying charring and calcination on the midface region (yellow rectangle), and along the gonial angle of the mandible (yellow arrow).

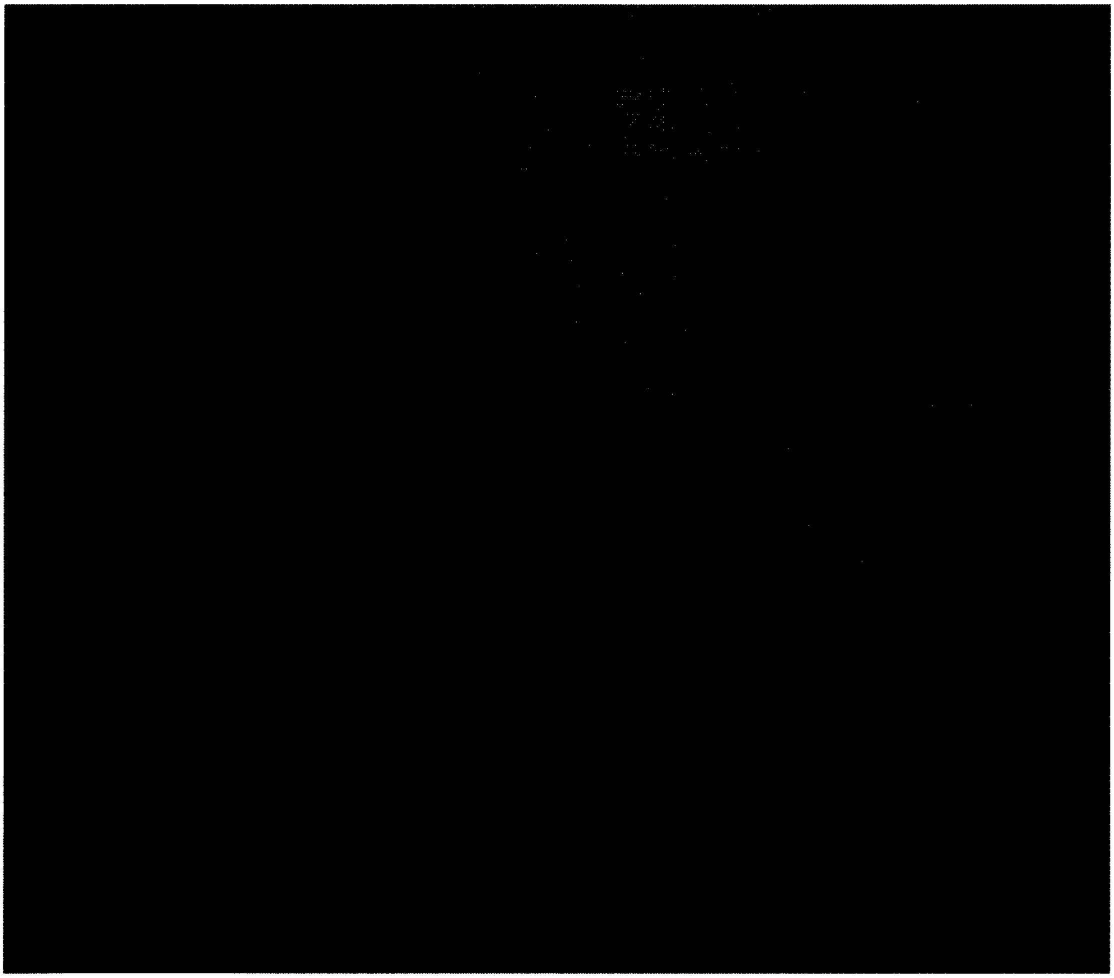

Figure 4.129 An overall image of the skull of pig #4 displaying the charring and calcination on the ventral surface of the cranium and the dorsal surface of the mandible.

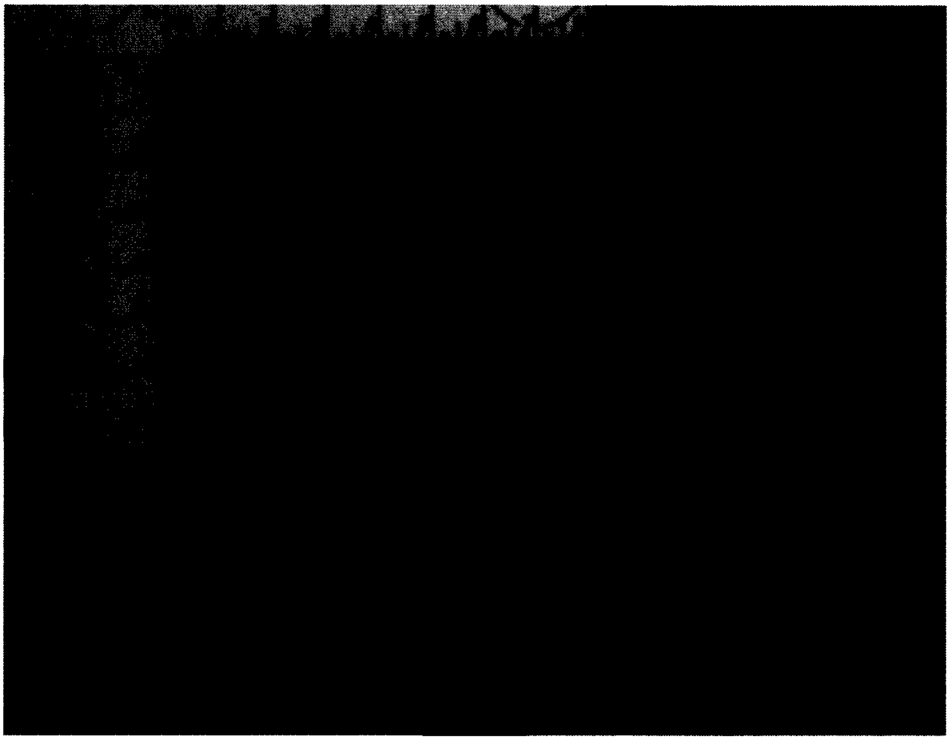

Figure 4.130 A mid-range image of the caudal aspect of the cranium of pig #6 (ventral-caudal view).

Evidence of moderate charring was also identified, caudal to the ribcage, in the innominate bones and the hind limbs. Charring was present on the lateral aspect of the ischium and lesser sciatic notch and on the iliac crest of the right innominate bone. Similarly, charring was present on the iliac crest of the left innominate bone with mild charring present on the medial aspect of the ilium shaft and the auricular surface (Figures 4.131 to 4.132). Less thermal damage was found on the innominate bones than on the femora. The right femur had charring on its proximal and distal epiphyses, the caudal surface of its metaphysis, and the distal one-fifth of the anterior surface of the metaphysis. The left femur had mild charring on its proximal epiphyses, the distal one-third of the anterior surface of the metaphysis, and the trochlea (Figures 4.133 to 4.136).

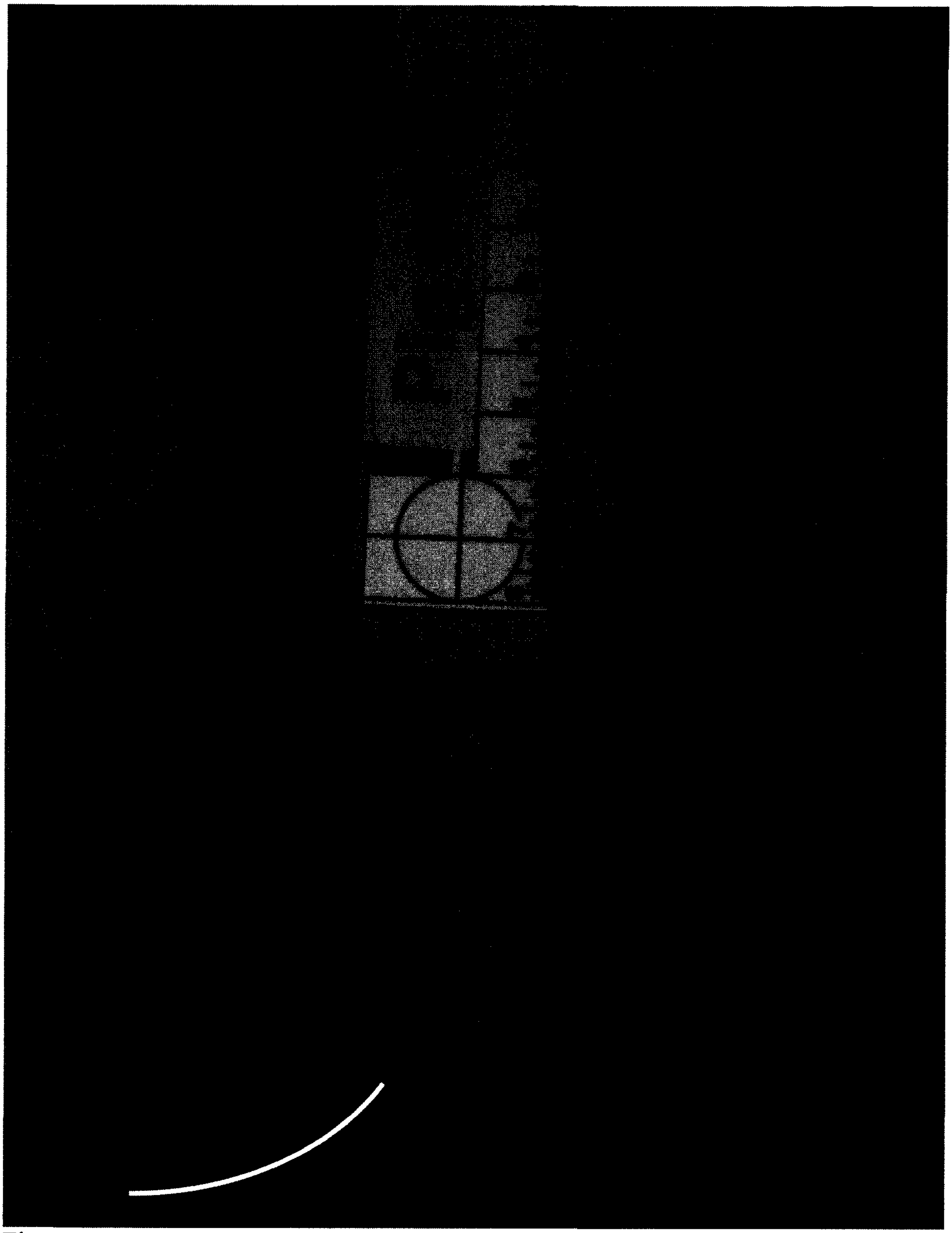

Figure 4.131 An overall image of the right and left innominate bones of pig # 6 (left to right, lateral view). Note the post mortem damage to the ischium of the right innominate bone (yellow arc).

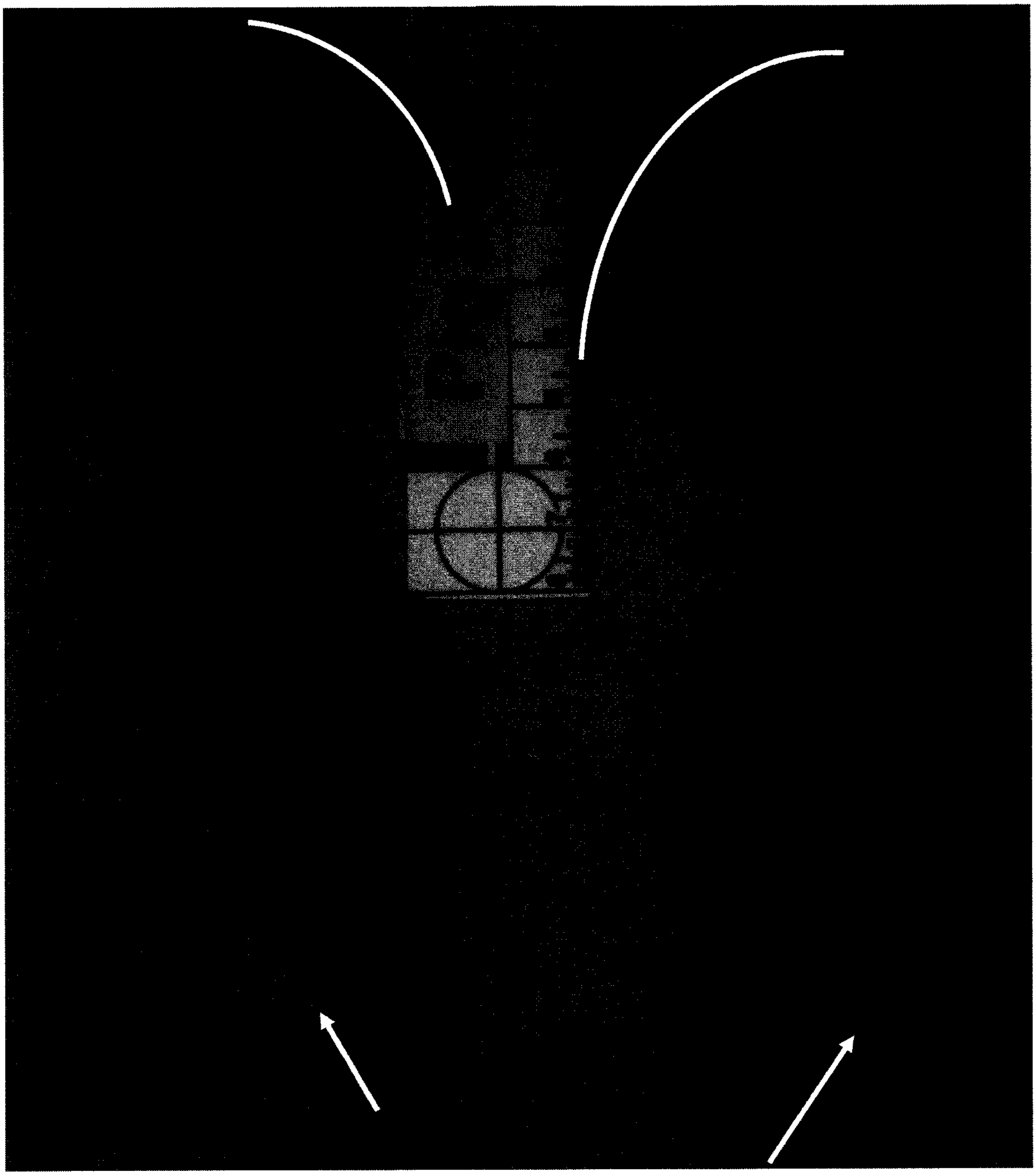

Figure 4.132 An overall image of the right and left innominate bones of pig # 6 (left to right, medial view). Note the charring present on the ischia of the right and left innominate bones (yellow arrows) and along the ilia crests (yellow arcs).

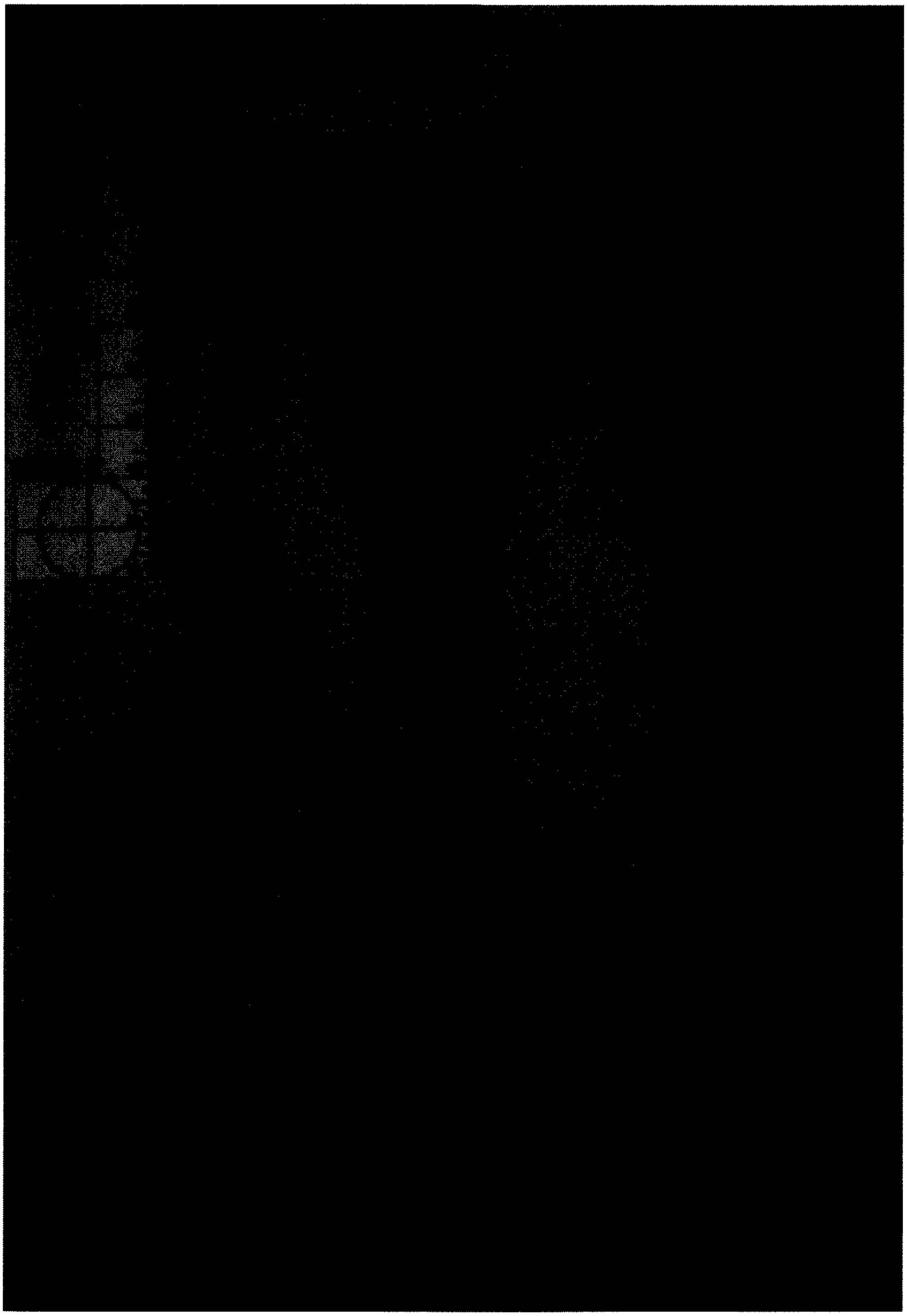

Figure 4.133 An overall image of the right and left femora of pig #6 left to right, cranial view). Note the charring present on the proximal and distal epiphyses, which caused the post mortem removal of cortical bone.

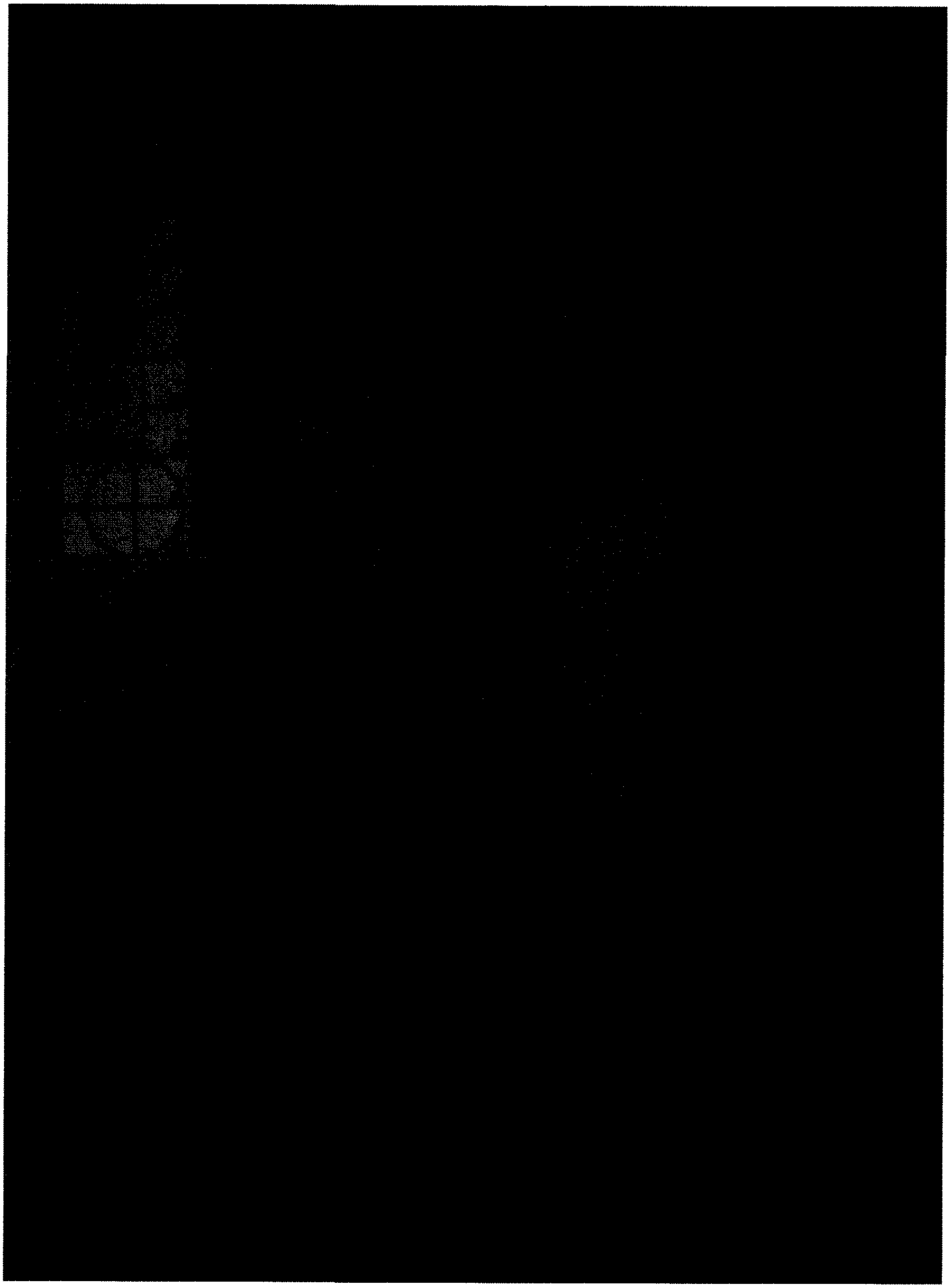

Figure 4.134 An overall image of the right and left femora of pig #6 (left to right, caudal view). Note the heavy charring and calcination on the caudal surface of the right femoral metaphysis which caused extensive post mortem removal of cortical bone.

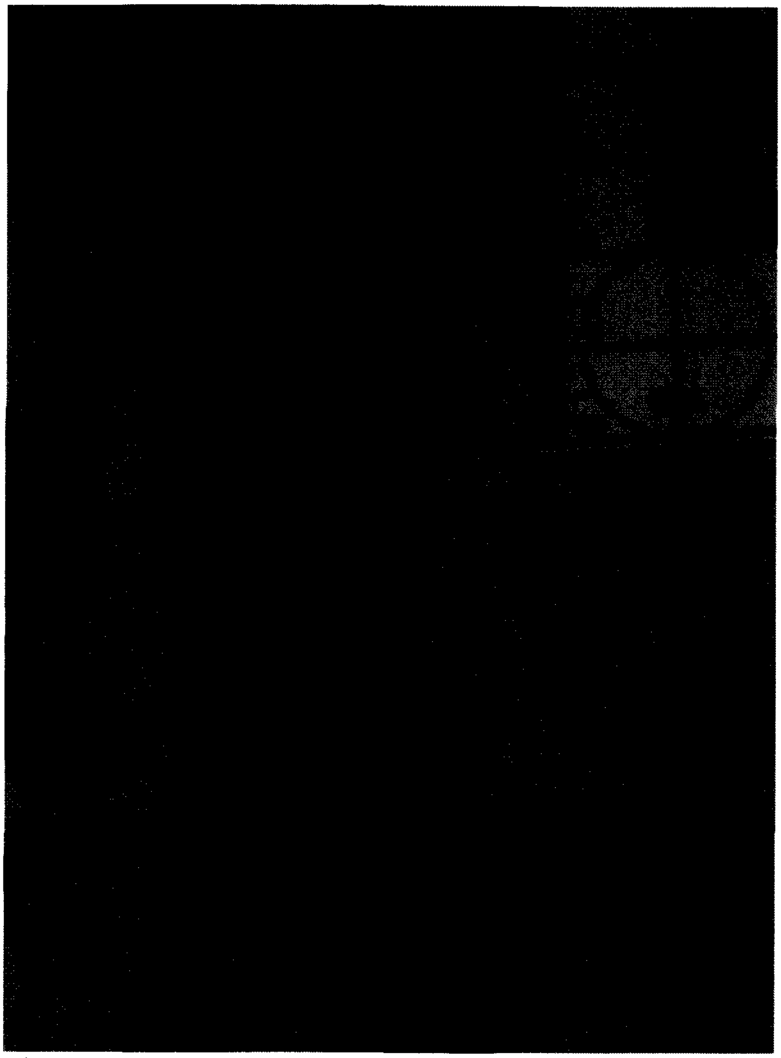

Figure 4.135 A mid-range image illustrating the post mortem damage on the caudal surface of the metaphysis of the right femur. Note the cortical bone that was removed post mortem from the proximal and distal one-thirds of the metaphysis.

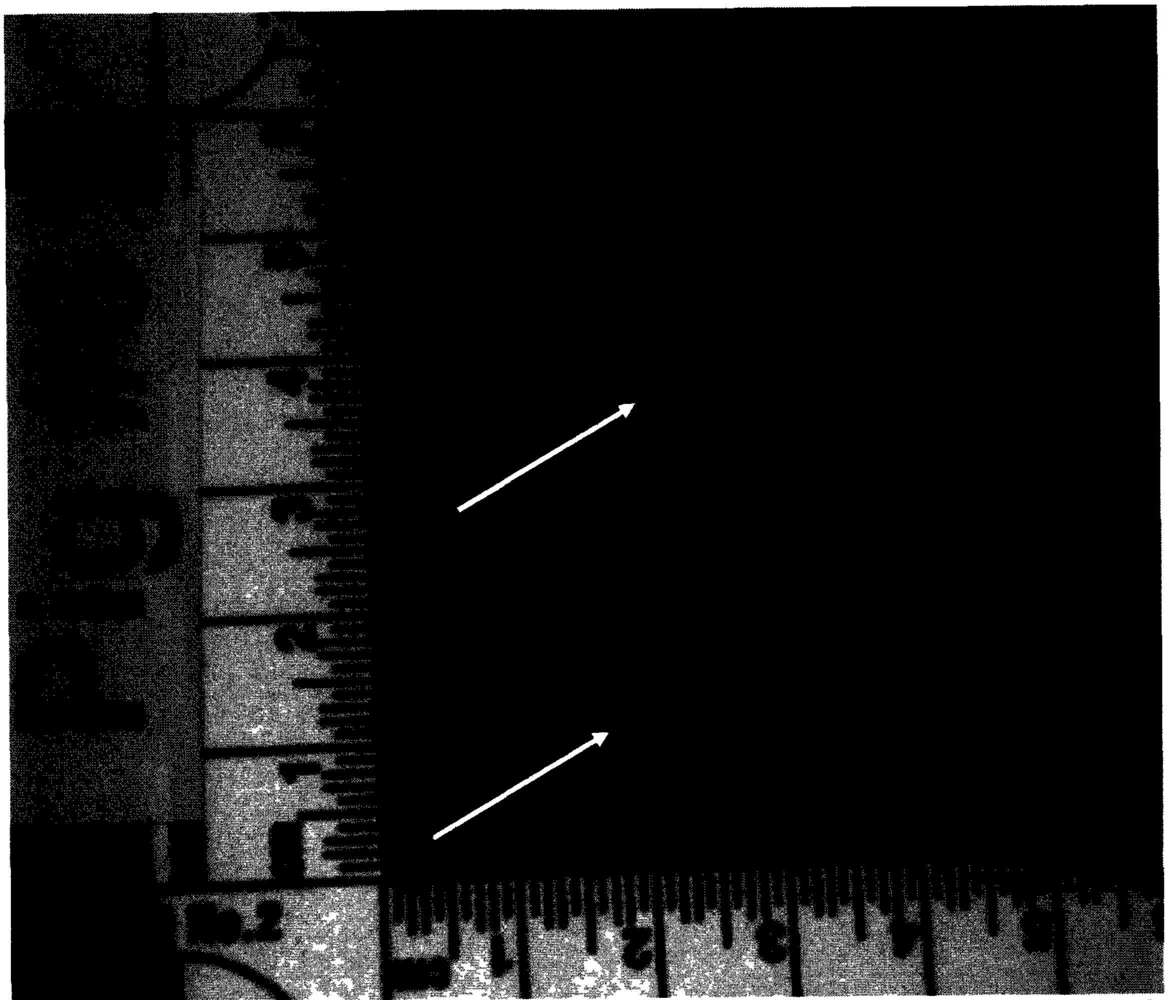

Figure 4.136 A close-up image of the distal end of the metaphysis and distal epiphysis of the left femur. Note the cortical bone removed post mortem due to heavy charring of the bone (yellow arrows).

Thermal injuries on the tibiae and fibulae were of the same intensity as seen in the femora. The right tibia had charring on the medial aspect of the tibial crest and the proximal one-fourth of the cranial and caudal surface of the metaphysis, while the left tibia had minimal charring on the lateral aspect of the metaphysis and the lateral condyle of the proximal epiphysis. The shafts of both fibulae were also charred extensively, although thermal damage further distal of the hind limb regions was minimal (Figure 4.137 to 4.142).

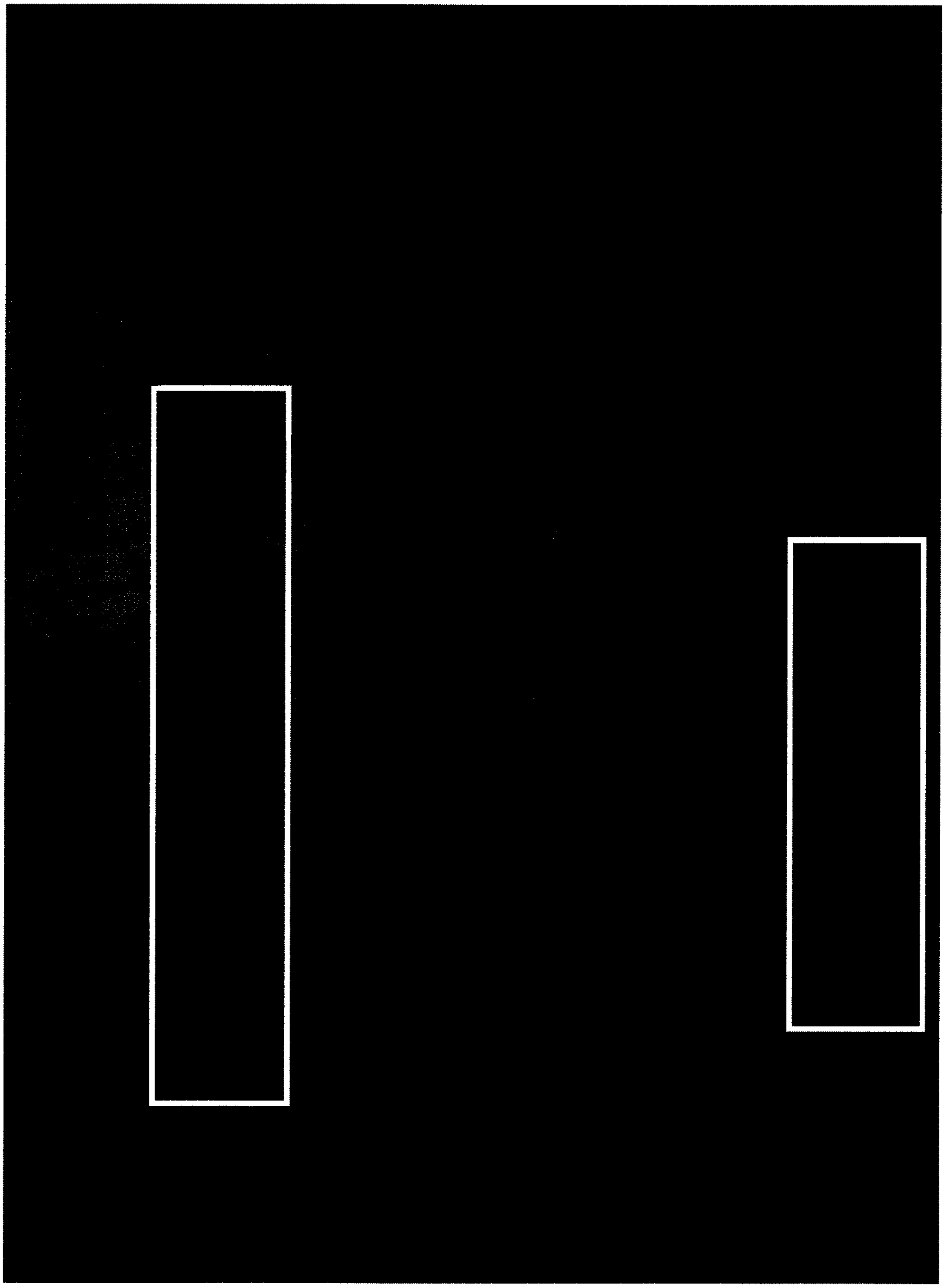

Figure 4.137 An overall image of the right fibula and tibia and the left tibia and fibula of pig #6 (left to right, cranial view). Note the thermal damage to the right and left fibula resulted in post mortem breaks to the shaft of each bone (yellow rectangles).

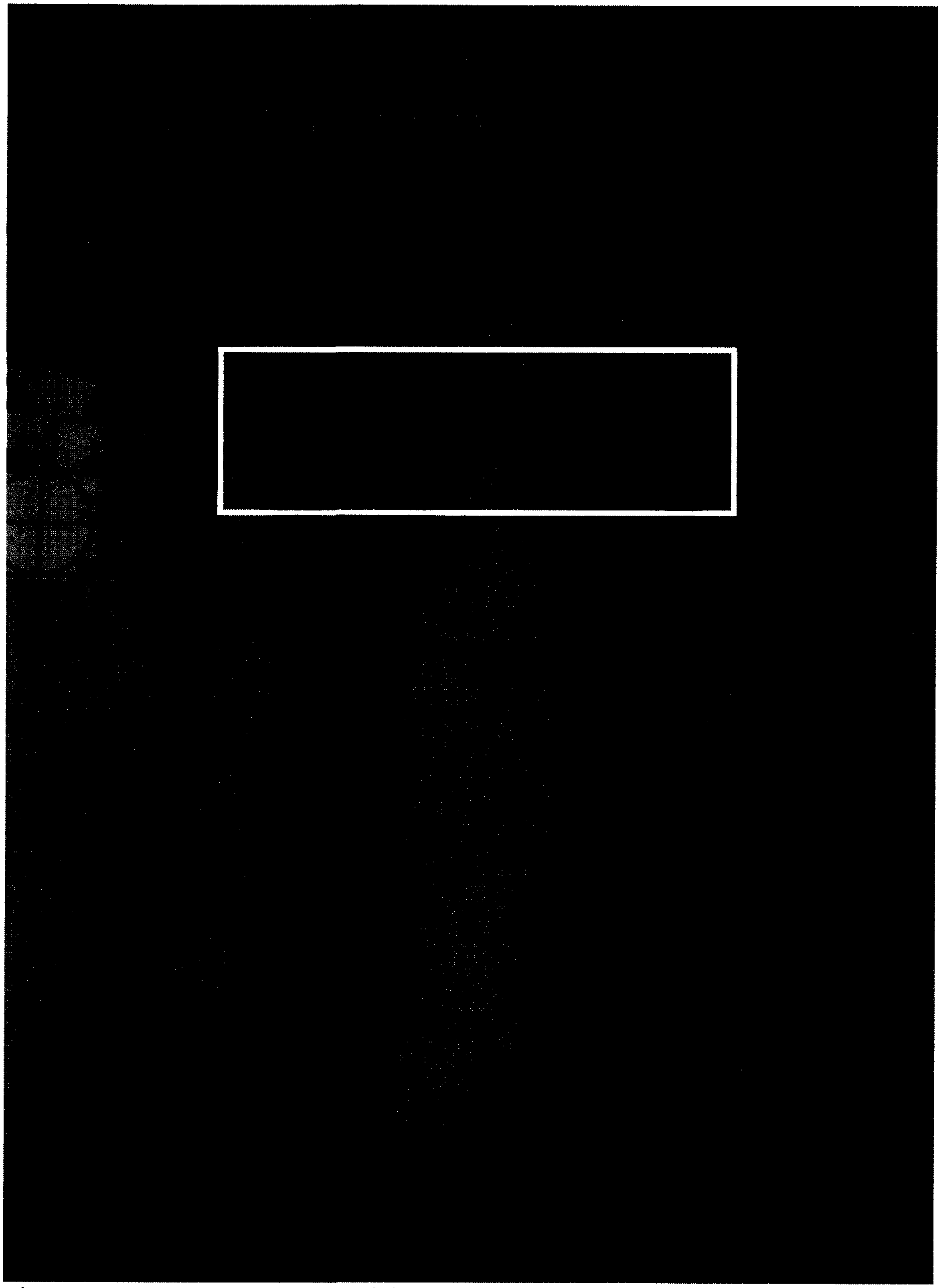

Figure 4.138 An overall image of the right fibula and tibia and the left tibia and fibula of pig #6 (left to right, caudal view). Note the removed cortical bone on the proximal one-fourth of the metaphysis of each tibia (yellow rectangle).

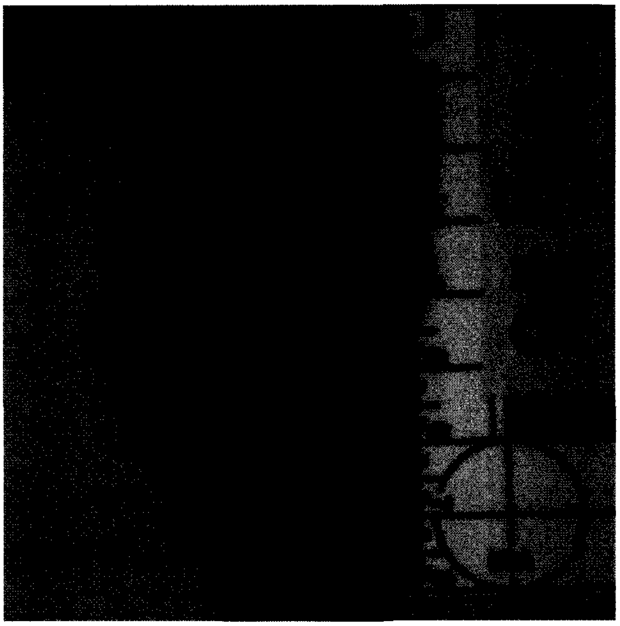

Figure 4.140 A mid-range image of the proximal end of the right tibia of pig #6 (lateral view). Note the charring present on the lateral aspect of the tibial crest.

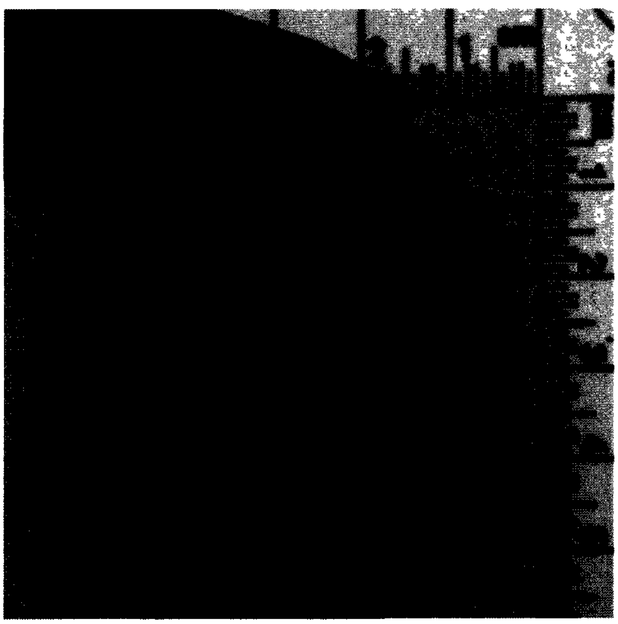

Figure 4.141 A mid-range image of the proximal end of the right tibia of pig #6 (caudal view). Not the cortical bone which was removed post mortem from the proximal epiphysis and the proximal end of the metaphysis.

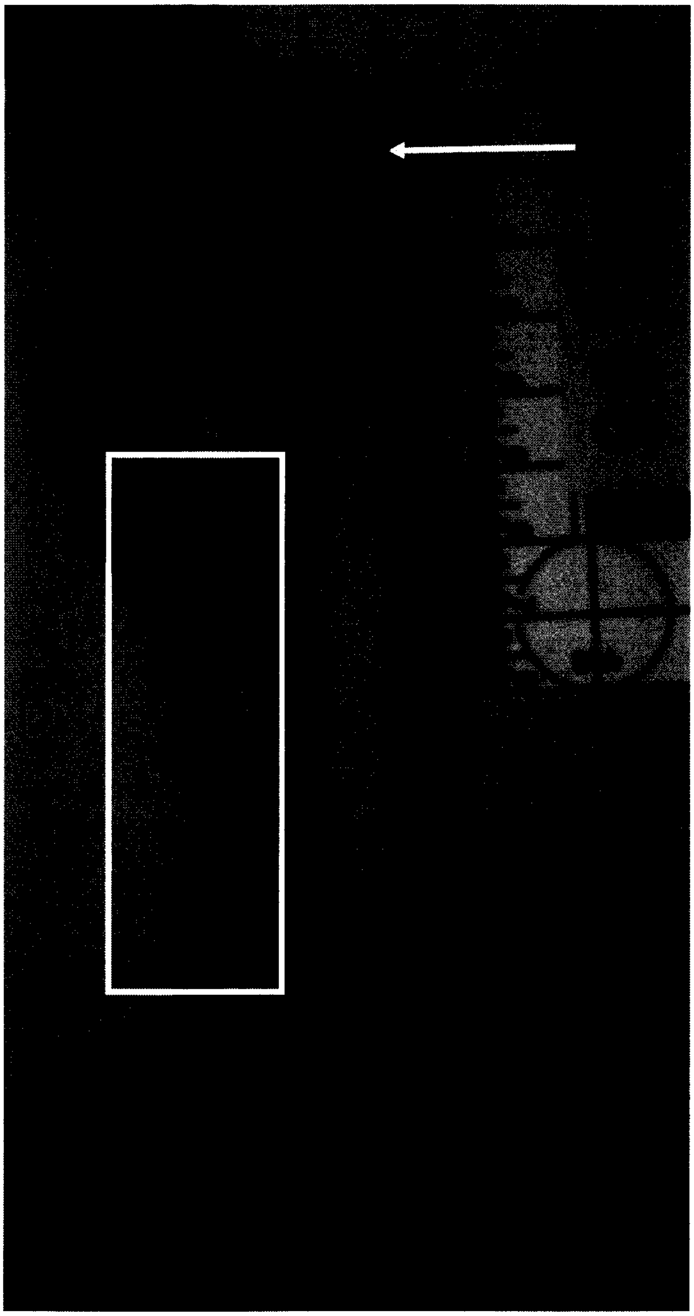

Figure 4.142 An overall image of the lateral aspect of the left tibia of pig #6. Note the cortical bone removed post mortem from the proximal epiphysis (yellow arrow) and the charring on the lateral aspect of the metaphysis (yellow rectangle).

Thermal damage distal of the tibia included small amounts of charring on the calcanei, astragali, and the third and fourth right metatarsal bones. The right calcaneus, also known as the fibular tarsal bone in pigs, had damage to the dorsal surface on the dorsal epiphysis and articular surface, while the left calcaneus had minimal charring present on the distal epiphysis and the plantar surface. The right astragalus, also known as the tibial tarsal bone in pigs, had damage to its medial surface that was similarly found on the plantar surface of the astragulus. Charring was present on both left and right tarsal bones; however, their identity remains undetermined due to lack of pig skeletal anatomy literature. Lastly, charring was present on the distal epiphyses of the third and fourth right metatarsals (Figures 4.143 to 4.146).

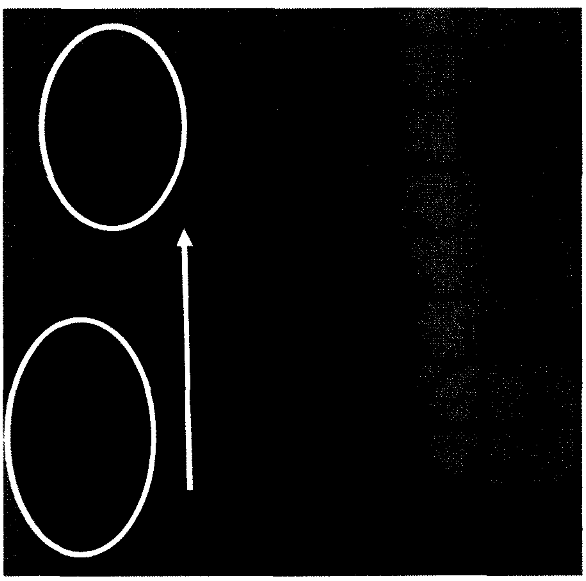

Figure 4.143 An overall image of the right calcaneus and astragulus of pig #6 (left to right, dorsal view). Note the cortical bone removed due to fragile charred bone at the distal epiphysis and articular surface of the calcaneus (yellow circles) and the medial surface of the astragulus (yellow arrow).

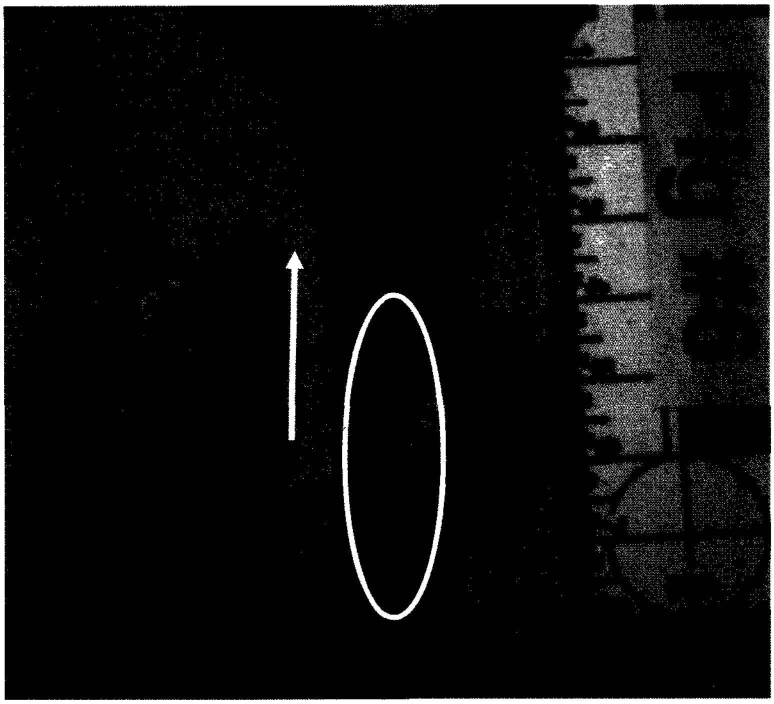

Figure4.144 An overall image of the left astragulus and calcaneus of pig #6 (left to right, plantar view). Note the cortical bone removed due to fragile charred bone at the lateral aspect of the plantar surface of both the astragulus (yellow arrow) and calcaneus (yellow circle).

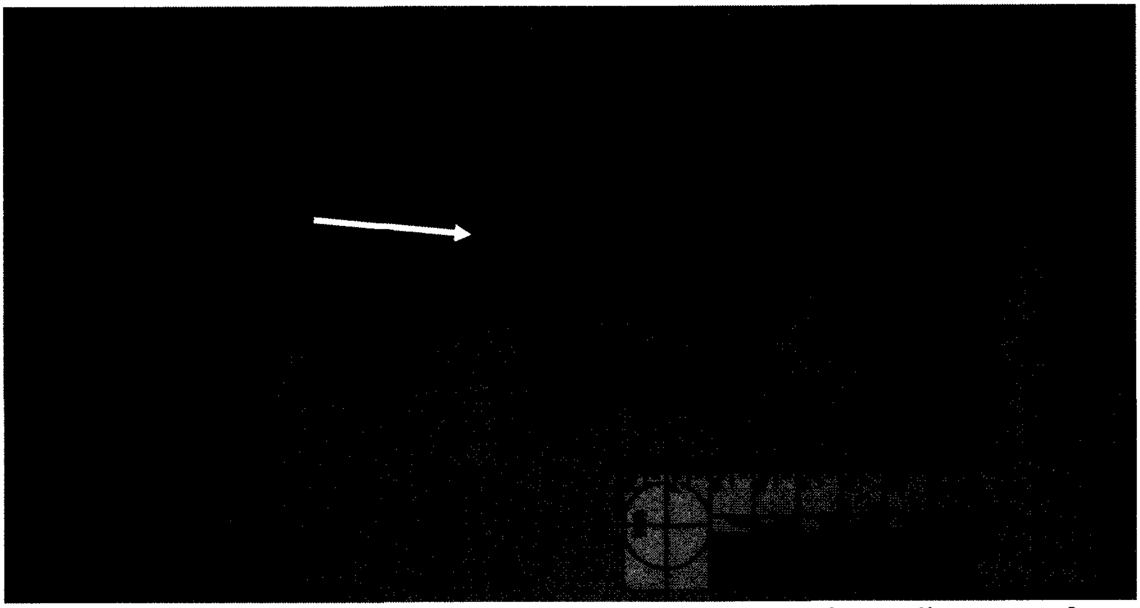

Figure 4.145 An overall image of the right pes of pig #6. Note the small amount of charring present on the distal epiphyses of the 3rd and 4th metatarsals (yellow arrow) and the proximal and intermediate phalanges.

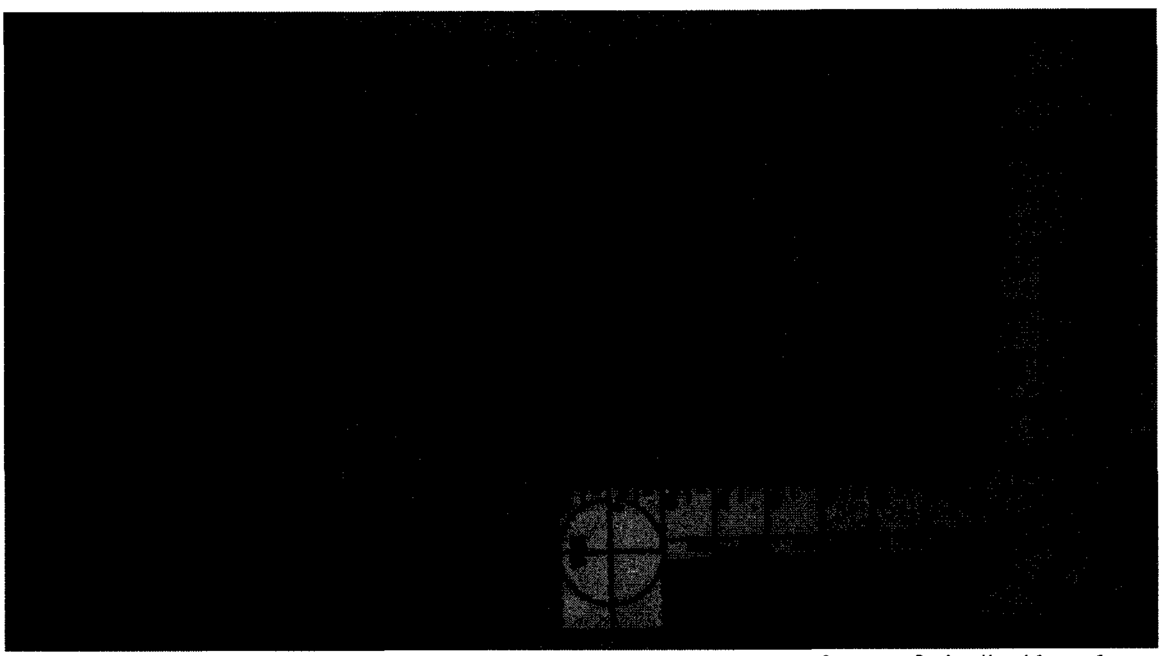

Figure 4.146 An overall image of the charring present on the left pes of pig #6 (dorsal view).

4.3.3.3 No Notable Burn Pattern Signature for Remains in a State of Skeletonization

If remains are in a state of skeletonization, prior to exposure to fire, they will receive intense heat exposure due to the minimal protection afforded by the remnants of soft and mummified tissues. This was exemplified in the remains of this pig paired group, pigs #5 and #6. Primary amounts of calcination and secondary amounts of charring were heavily focused on several aspects of the skeletal remains in the pelvic girdle of pig #5. Charring was also observed radiating away from the pelvic girdle region of pig #5 in both cranial and caudal directions. Charring was seen on the lower thoracic vertebrae, the lower left ribs and the right gonial angle of the mandible in the cranial direction and on several of the skeletal remains in the hind limb regions. In pig #6, primary amounts of calcination and secondary amounts of charring were heavily manifested on the skeletal remains that comprise the trunk region. Charring and calcination were intense on the right and left scapulae, the right and left ribs and the cervical and thoracic vertebrae. Evidence of charring was also found in the proximal and distal ends of the humeri and stained on the skeletal remains of the hind limb regions.

In summary, thermal injuries in regions of the caudal and hind limb areas were common amongst both pigs (Figures 4.147 to 4.148). However, it was obvious that the severity of the heat related skeletal damages were inconsistent, as highlighted on the two three-dimensional illustrations. In pig #5, the most intense of charring and calcination was present in the skeletal elements of the pelvic girdle; whereas in pig #6 the most intense damage was present in the skeletal elements of the ribcage. Charring and calcination was also present in the hind limb region of both pigs, yet, the extent of the thermal damages was primarily restricted to the left side in pig #5 and almost equally distributed in pig #6. As a result, although similar regions of both pigs were affected by thermal exposure, the intensity of their damages was strikingly different. Therefore, based on the findings of this experiment, no significant or predictable burn pattern signature could be identified for the state of "skeletonization."


Figure 4.147 An anatomical diagram illustrating the areas of charring (red circles) and calcination (yellow circles) identified on the skeletal remains of pig #5 (left lateral view) (www.turbosquid.com).

Figure 4.148 An anatomical diagram illustrating the areas of charring (red circles) and calcination (yellow circles and arc) identified on the skeletal remains of pig #6 (left lateral view) (www.turbosquid.com).

4.4. Taphonomic Mechanisms: Mimicry of Colour and Surface Texture

4.4.1. Munsell Colour Readings Unique to Burned Remains

A total of 99 individual Munsell colour readings were collected from the burned remains of the "advanced decomposition" and "skeletonization" pig paired groups (Table 4.3) These colour readings represented shades of charring and calcination found on the surface of the skeletal remains and were used for comparison to the Munsell colour readings of the "control" pig paired group. Through colour comparison, it was determined that 47.5% of the 99 Munsell colour readings were colours unique to the surface of the burned remains because no matches were found against the colour readings belonging to the "control" pig paired group. These 47 Munsell colour readings represented 18 common colours, including: light gray, gray, dark gray, very dark gray, very dark greenish gray, very dark grayish green, greenish black, very dark bluish gray, bluish gray, bluish black, dark bluish gray, reddish black, weak dusky red, weak red, reddish brown, pinkish grey, pale yellow, and black. These common colours represented aspects of the skeletal remains that were distinctly charred or calcinated by the brush fires.

Table 4.2 A listing of 47.5% of the 99 Munsell colour readings that are unique to burned remains.

Munsell Colour Reading	# of Matches to Control pig pair	Common Name of Munsell Colour Reading	Closest Munsell Colour Reading for Comparison	Mimicry Match
N 1.5	0	N/A	-	Category 3
N 2.0	0	N/A	-	Category 3
N 2.5	0	black	-	Category 3
N 3.0	0	very dark gray	-	Category 3
N 3.5	0	N/A n/a	-	Category 3
N 4.0	0	dark gray	-	Category 3
N 4.5	0	N/A	-	Category 3
N 5.0	0	gray	-	Category 3
N 5.5	0	N/A	-	Category 3
N 6.0	0	gray	-	Category 3
N 6.5	0	N/A	-	Category 3
N 7.5	0	light gray	-	Category 3
10 Y 3/ 1	0	very dark greenish gray	-	Category 3
10 Y 3/ 3	0	N/A	-	Category 3
10 Y 3/ 4	0	N/A	-	Category 3
2.5GY 2/ 1	0	greenish black	5GY 2.5/1	Category 3
5 GY 2/ 1	0	greenish black	-	Category 3
7.5GY 2/ 1	0	greenish black	10GY 2.5/1	Category 3
7.5GY 2/ 3	0	N/A	-	Category 3
10 GY 3/ 1	0	very dark greenish gray	-	Category 3
2.5G 2/ 1	0	greenish black	5G 2.5/1	Category 3
2.5G 2/ 2	0	very dark grayish green	5G 2.5/2	Category 3
5 G 3/ 3	0	very dark grayish green	5 G 3/2	Category 3
10 G 2/ 1	0	greenish black	10 G 2.5/1	Category 3
10 G 4/ 3	0	dark greenish gray	10 G 4/1	Category 3
5 BG 2/ 1	0	greenish black	5BG 2.5/1	Category 3
7.5BG 3/ 4	0	very dark greenish gray	10BG 3/1	Category 3
10 BG 2/ 2	0	greenish black	10 BG 2.5/1	Category 3
2.5B 3/ 1	0	very dark bluish gray	10B 3/1	Category 3
7.5B 3/ 1	0	very dark bluish gray	10B 3/1	Category 3
10 B 5/ 1	0	bluish gray	-	Category 3
2.5PB 2/ 1	0	bluish black	5PB 2.5/1	Category 3
2.5PB 4/ 1	0	dark bluish gray	5PB 4/1	Category 3
2.5PB 5/ 2	0	bluish gray	5PB 5/1	Category 3

Table 4.2 (cont'd) A listing of 47.5% of the 99 Munsell colour readings that are unique to burned remains.

Munsell Colour Reading	# of Matches to Control pig pair	Common Name of Munsell Colour Reading	Closest Munsell Colour Reading for Comparison	Mimicry Between
5 PB 4/ 1	0	dark bluish gray	-	Category 3
7.5R 2/ 1	0	reddish black	7.5R 2.5/1	Category 3
10 R 2/ 2	0	weak dusky red	10 R 2.5/2	Category 3
10 R 4/ 4	0	weak red	-	Category 3
2.5YR 4/ 4	0	reddish brown	-	Category 3
5 YR 7/ 2	0	pinkish gray	-	Category 3
10 YR 7/ 1	0	light gray	-	Category 3
2.5Y 8/ 3	0	pale yellow	-	Category 3
5 Y 2/ 1	0	black	5 Y 2.5/1	Category 3
2.5P 3/ 1	0	N/A	-	Category 3
5P 2/1	0	N/A	-	Category 3
2.5RP 2/ 1	0	N/A	-	Category 3
5 RP 2/ 3	0	N/A	-	Category 3

4.4.2. Mimicry of Colour between Burned Remains and Category 1 (Soil Interaction or Decomposed Tissue/Fluid)

The remaining 52.5% of the 99 Munsell colour readings provided the premise to determine if mimicry of colour was possible between the surface of skeletal pig remains that were burned and those that decomposed naturally in an outdoor environment. Through comparison of Munsell colour readings with the "control" pig paired group, these 52 colour readings were further divided into two separate groups based on the categories to which colour matches were made. A total of 23.2% of the 99 Munsell colour readings from the burned remains overlapped with Category 1 of the "control" pig paired group, while the remaining 29.3% of the 99 Munsell colour readings overlapped with Categories 1 and 2 of the "control" pig paired group.

The first 23.2% of the 99 Munsell colour readings represented mimicry of colour between skeletal remains that were charred and those that were interacting with the soil or commingled with decomposed tissue and fluid (Table 4.4). These 23 Munsell colour readings produced a total of 359 colour reading matches in the "control" pig paired group. These 23 Munsell colour readings collectively represented 10 common colours, which included: dark brown, black, very dark brown, very dark gray, dark reddish brown, dark yellowish brown, reddish gray, dark gray, gray, and light gray (Table 4.5). The most common colour matches within this group were associated with dark brown, black, very dark brown and very dark gray. They accounted for 85.23% of all colour matches within this group of selected data

Table 4.3 A listing of 23.2% of the 99 Munsell colour readings collected from the burned remains that made positive colour matches to only category (1), soil interaction or decomposed tissue/fluid of the "control" pig paired group.

Munsell Colour Reading	# of Matches to Control pig pair	Common Name of Munsell Colour Reading	Closest Munsell Colour Reading Comparison	Frequency (n=359)	Mimicry Between
5 YR 2/ 1	2	black	5 YR 2.5/1	0.56%	Category 1+3
5 YR 2/ 3	4	dark reddish brown	5 YR 2.5/3	1.11%	Category 1+3
5 YR 3/ 1	1	very dark gray	-	0.28%	Category 1+3
5 YR 3/ 3	8	dark reddish brown	-	2.23%	Category 1+3
5 YR 3/ 4	6	dark reddish brown	-	1.67%	Category 1+3
5 YR 4/ 1	3	dark gray	-	0.84%	Category 1+3
5 YR 5/ 2	9	reddish gray	-	2.51%	Category 1+3
7.5YR 2/ 1	12	black	7.5 YR 2.5/1	3.34%	Category 1+3
7.5YR 2/ 3	40	very dark brown	7.5YR 2.5/3	11.14%	Category 1+3
7.5YR 3/ 1	9	very dark gray	-	2.51%	Category 1+3
7.5YR 3/ 2	91	dark brown	-	25.35%	Category 1+3
7.5YR 3/ 3	106	dark brown	-	29.53%	Category 1+3
7.5YR 4/ 1	5	dark gray	-	1.39%	Category 1+3
7.5YR 5/ 1	4	gray	-	1.11%	Category 1+3
10 YR 2/ 1	9	black		2.51%	Category 1+3
10 YR 3/ 1	6	very dark gray		1.67%	Category 1+3
10 YR 3/ 4	11	dark yellowish brown		3.06%	Category 1+3
2.5Y 2/ 1	8	black	2.5Y 2.5/1	2.23%	Category 1+3
2.5Y 2/ 2	17	black	2.5Y 2.5/1	4.74%	Category 1+3
2.5Y 3/ 1	4	very dark gray		1.11%	Category 1+3
2.5Y 7/ 1	2	light gray		0.56%	Category 1+3
5 Y 3/ 1	1	very dark gray		0.28%	Category 1+3
5 Y 4/ 1	1	dark gray		0.28%	Category 1+3

Table 4.4 A listing of the 10 collective colours that were produced from the 23 Munsell colour readings and the frequencies they were found within the 359 colour matches to the "control" pig paired group.

Frequency found (based on 359 matches)	Common Name of Munsell Colour Reading	Munsell Colour Readings which produce the same Common Name	Closest Munsell Colour Reading to produce a Common Name for Colour
54.87%	dark brown	7.5YR 3/ 3, 7.5YR 3/ 2	
13.37%	black	5 YR 2/ 1, 2.5Y 2/ 2, 7.5YR 2/ 1, 10 YR 2/ 1, 2.5Y 2/ 1	5 YR 2.5/1, 2.5Y 2.5/1, 7.5 YR 2.5/1, 2.5Y 2.5/1
11.14%	very dark brown	7.5YR 2/ 3	7.5YR 2.5/3
5.85%	very dark gray	7.5YR 3/ 1, 10 YR 3/ 1, 2.5Y 3/ 1, 5 YR 3/ 1, 5 Y 3/ 1	
5.01%	dark reddish brown	5 YR 3/ 3, 5 YR 3/ 4, 5 YR 2/ 3	5 YR 2.5/3
3.06%	dark yellowish brown	10 YR 3/ 4	
2.51%	reddish gray	5 YR 5/ 2	
2.51%	dark gray	7.5YR 4/ 1, 5 YR 4/ 1, 5 Y 4/ 1	
1.11%	gray	7.5YR 5/ 1	
0.56%	light gray	2.5Y 7/ 1	

4.4.3. Mimicry of Colour between Burned Remains and Category 1(Soil Interaction or Decomposed Tissue/Fluid) and Category 2 (Sun Bleaching)

The last 29.3% of the 99 Munsell colour readings, collected from the burned remains of the "advanced decomposition" and "skeletonization" pig pair groups, produced colour matches with colour readings from both Category 1 and Category 2 from the "control" pig pair group (Table 4.6). These 29 Munsell colour readings produced a total of 1509 colour matches with the control group and represented 16 common colours collectively (Table 4.7). These colours included: brown, grayish brown, dark grayish brown, light grayish brown, very dark brown, vary dark grayish brown, dark brown, pale brown, pinkish gray, yellowish brown, black, light gray, dark reddish brown, dark gray, gray and pink. The most frequently occurring colours included brown, grayish brown and dark grayish brown. They accounted for approximately 66.67% of the colour matches made in this group. Although all 29 Munsell colour readings were found associated with Category 1, soil interaction or decomposed tissue/fluid, and Category 2, sun bleaching, the majority of common colours were associated with a darker staining. Only 13.71% of the Munsell colour matches made with the 29 Munsell colour readings came from lighter sourced colours. This included the commonly named colours: pinkish gray (7.5YR 6/ 2 or 7.5YR 7/2), pink (7.5YR 7/ 3), light brownish gray (10 YR 6/2), pale brown (10 YR 6/ 3), and light gray (10 YR 7/ 2).

Table 4.5 A listing of 29.3% of the 99 Munsell colour readings collected from the burned remains that made positive colour matches to category (1), soil interaction or decomposed tissue/fluid, and category (2), sun bleaching of the "control" pig paired group.

Munsell Colour	# of Matches to Control pig pair	Common Name of Munsell Colour Reading	Closest Munsell Colour Reading Comparison	Frequency (n=1509)	Mimicry Between
N 1.0	14	black		0.75%	Category 1+2+3
5 YR 2/ 2	16	dark reddish brown	5 YR 2.5/ 2	0.86%	Category 1+2+3
7.5YR 2/ 2	24	very dark brown	7.5 YR 2.5/ 2	1.28%	Category 1+2+3
7.5YR 4/ 2	50	brown		2.68%	Category 1+2+3
7.5YR 4/ 3	134	brown		7.17%	Category 1+2+3
7.5YR 4/ 4	42	brown		2.25%	Category 1+2+3
7.5YR 5/ 2	60	brown		3.21%	Category 1+2+3
7.5YR 5/ 3	94	brown		5.03%	Category 1+2+3
7.5YR 5/ 4	29	brown		1.55%	Category 1+2+3
7.5YR 6/ 2	33	pinkish gray		1.77%	Category 1+2+3
7.5YR 7/ 2	11	pinkish gray		0.59%	Category 1+2+3
7.5YR 7/ 3	7	pink		0.37%	Category 1+2+3
10 YR 2/ 2	53	very dark brown		2.84%	Category 1+2+3
10 YR 3/ 2	65	very dark grayish brown		3.48%	Category 1+2+3
10 YR 3/ 3	65	dark brown		3.48%	Category 1+2+3
10 YR 4/ 1	5	dark gray		0.27%	Category 1+2+3
10 YR 4/ 2	149	dark grayish brown		7.98%	Category 1+2+3
10 YR 4/ 3	110	brown		5.89%	Category 1+2+3
10 YR 5/ 2	169	grayish brown		9.05%	Category 1+2+3
10 YR 5/ 3	132	brown		7.07%	Category 1+2+3
10 YR 5/ 4	30	yellowish brown		1.61%	Category 1+2+3
10 YR 6/ 2	82	light brownish gray		4.39%	Category 1+2+3
10 YR 6/ 3	56	pale brown		3.00%	Category 1+2+3

Table 4.5 (Cont'd) A listing of 29.3% of the 99 Munsell colour readings collected from the burned remains that made positive colour matches to category (1), soil interaction or decomposed tissue/fluid, and category (2), sun bleaching of the "control" pig paired group

Munsell Colour	# of Matches to Control pig pair	Common Name of Munsell Colour Reading	Closest Munsell Colour Reading Comparison	Frequency (n=1509)	Mimicry Between
10 YR 7/ 2	18	light gray		0.96%	Category 1+2+3
2.5Y 4/ 1	9	dark gray		0.48%	Category 1+2+3
2.5Y 4/ 2	12	dark grayish brown		0.64%	Category 1+2+3
2.5Y 5/ 1	10	gray		0.54%	Category 1+2+3
2.5Y 5/ 2	25	greyish brown		1.34%	Category 1+2+3
5 Y 2/ 2	5	black	5 Y 2.5/ 2	0.27%	Category 1+2+3

Table 4.6 A listing of the 16 collective colours that were produced from the 29 Munsell colour readings and the frequency they were found within the 1509 colour matches to the "control" pig paired group.

Frequency found (based on 1509 matches)	Common Name of Munsell Colour Reading	Munsell Colour Readings which produce the same Common Name	Closest Munsell Colour Reading to produce a Common Name for Colour
43.14%	brown	7.5YR 4/ 2, 7.5YR 4/ 3, 7.5YR 4/ 4, 7.5YR 5/ 2, 7.5YR 5/ 3, 7.5YR 5/ 4, 10 YR 4/ 3, 10 YR 5/ 3	
12.86%	grayish brown	10 YR 5/ 2, 2.5Y 5/ 2	
10.67%	dark grayish brown	10 YR 4/ 2, 2.5Y 4/ 2	
5.43%	light brownish gray	10 YR 6/ 2	
5.10%	very dark brown	7.5YR 2/ 2, 10 YR 2/ 2	7.5YR 2.5/2
4.31%	vary dark grayish brown	10 YR 3/ 2	
4.31%	dark brown	10 YR 3/ 3	
3.71%	pale brown	10 YR 6/ 3	
2.92%	pinkish gray	7.5YR 6/ 2, 7.5YR 7/ 2	
1.99%	yellowish brown	10 YR 5/ 4	
1.26%	black	N 1.0, 5 Y 2/ 2	5 Y 2.5/2
1.19%	light gray	10 YR 7/ 2	
1.06%	dark reddish brown	5 YR 2/ 2	5 YR 2.5/2
0.93%	dark gray	10 YR 4/ 1, 2.5Y 4/ 1	
0.66%	gray	2.5Y 5/ 1	
0.46%	pink	7.5YR 7/ 3	

4.4.4. A Macroscopic Mimicry Evaluation Performed by a Forensic Pathologist and Forensic Anthropologist

It was unattainable to select skeletal elements which exhibited colour from all three categories of colour staining for this macroscopic evaluation. Due to the low, 13.71%, frequency of overlapping colour readings found associated with light sources of staining from Category 2 and Category 3, an insufficient sample of skeletal references existed for this one comparison. Consequently, only skeletal elements which exhibited numerous overlapping colours between Category 1 and Category 3 were selected. As a result, an assortment of 20 skeletal elements that exhibited moderate amounts of charring and 30 skeletal elements that displayed comparative amount of staining due to soil interaction or decomposed tissue was chosen for this evaluation (Figures 4.204 to 4.214).

Experts successfully identified the source of colour staining on the skeletal exhibits with high scores of 84% and 90%. Only two of the same skeletal exhibits were incorrectly scored by both experts as probable natural decomposition; the fibula fragment, green star, and the right calcaneus, silver star.

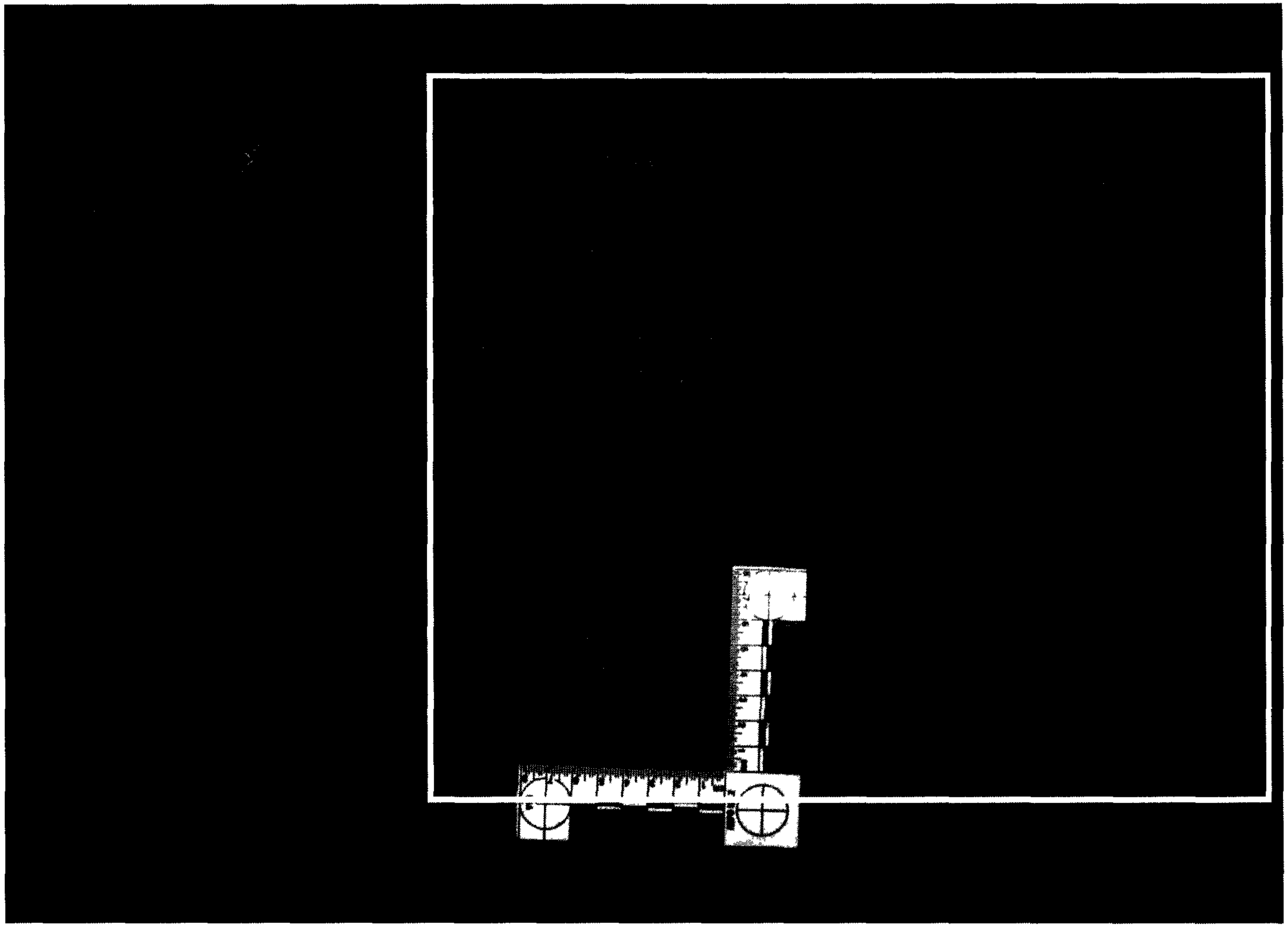

Figure 4.149 A variety of pig skulls used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

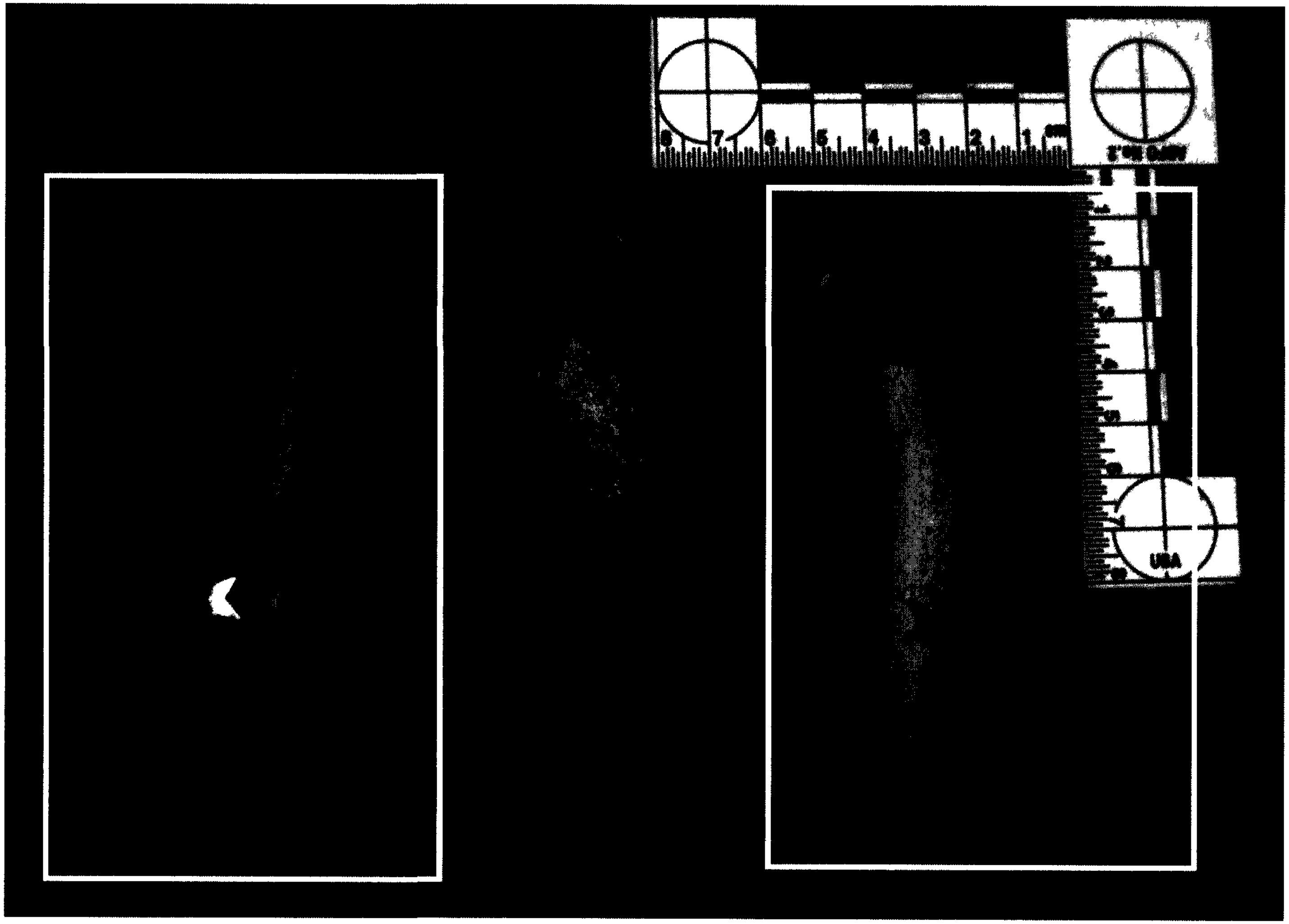

Figure 4.150 A variety of pig humerii used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

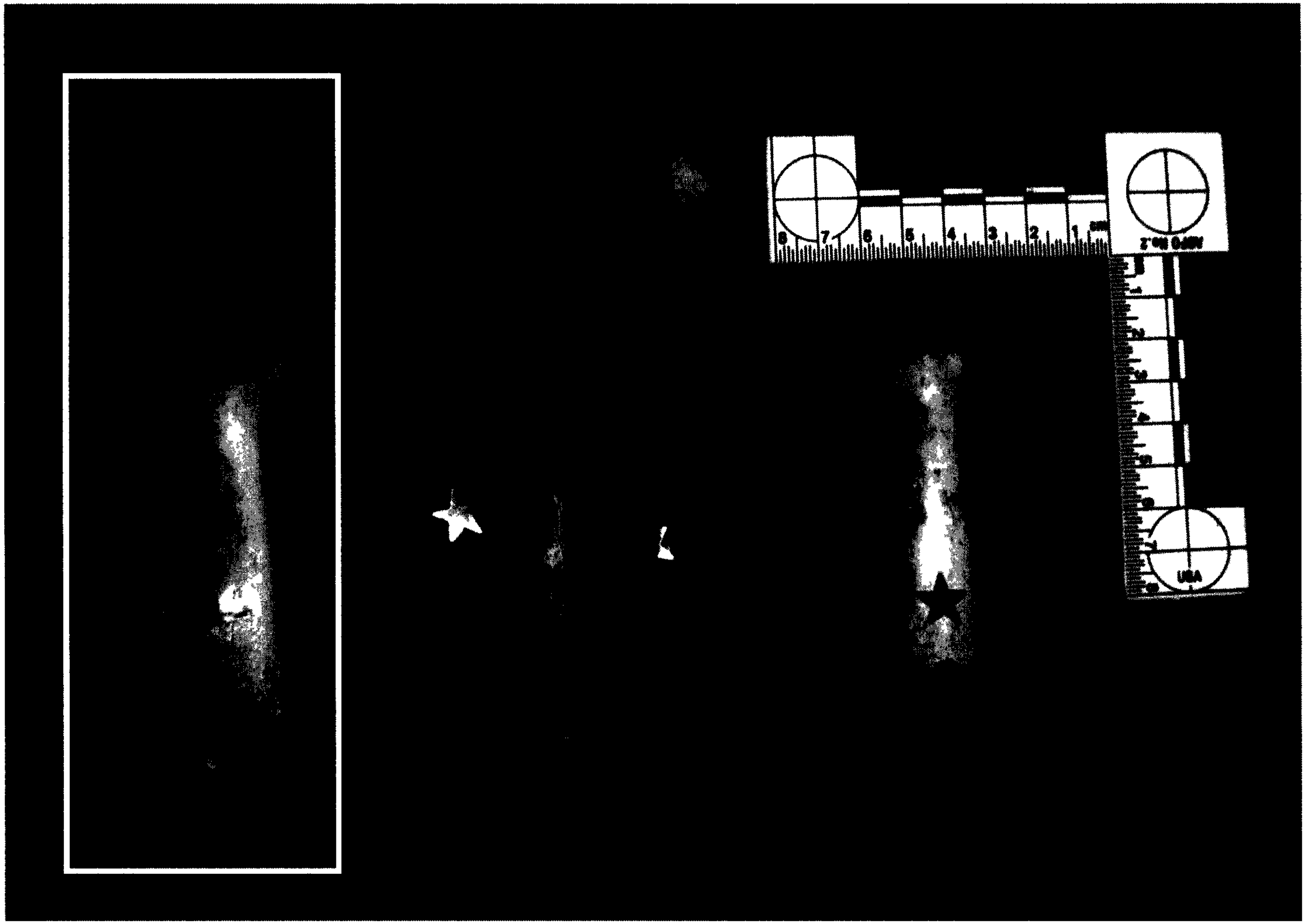

Figure 4.151 A variety of pig radii and ulnae used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

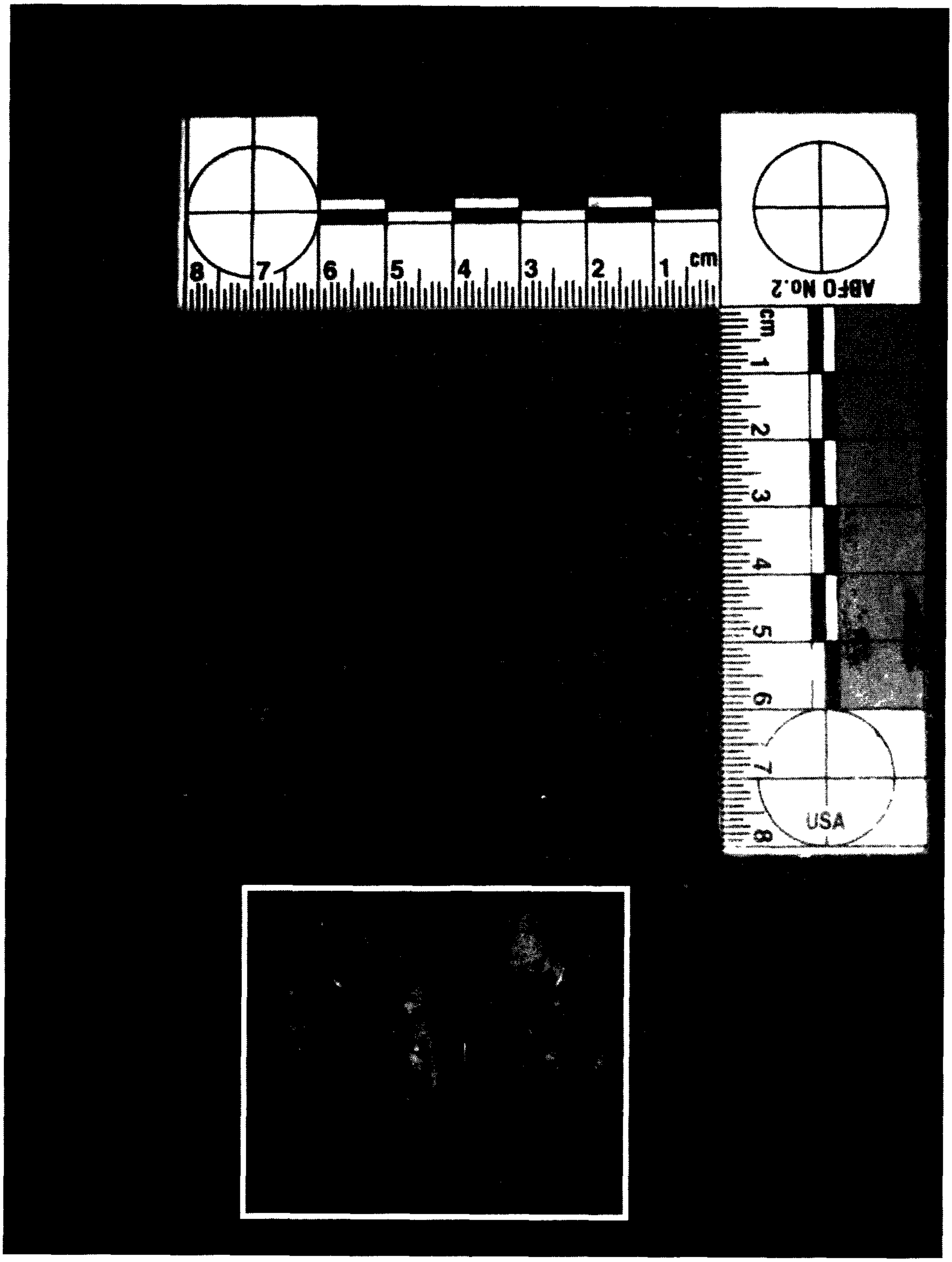

Figure 4.152 A variety of pig vertebrae used in the macroscopic evaluation of colour mimicry. The exhibit outlined in yellow received thermal trauma.

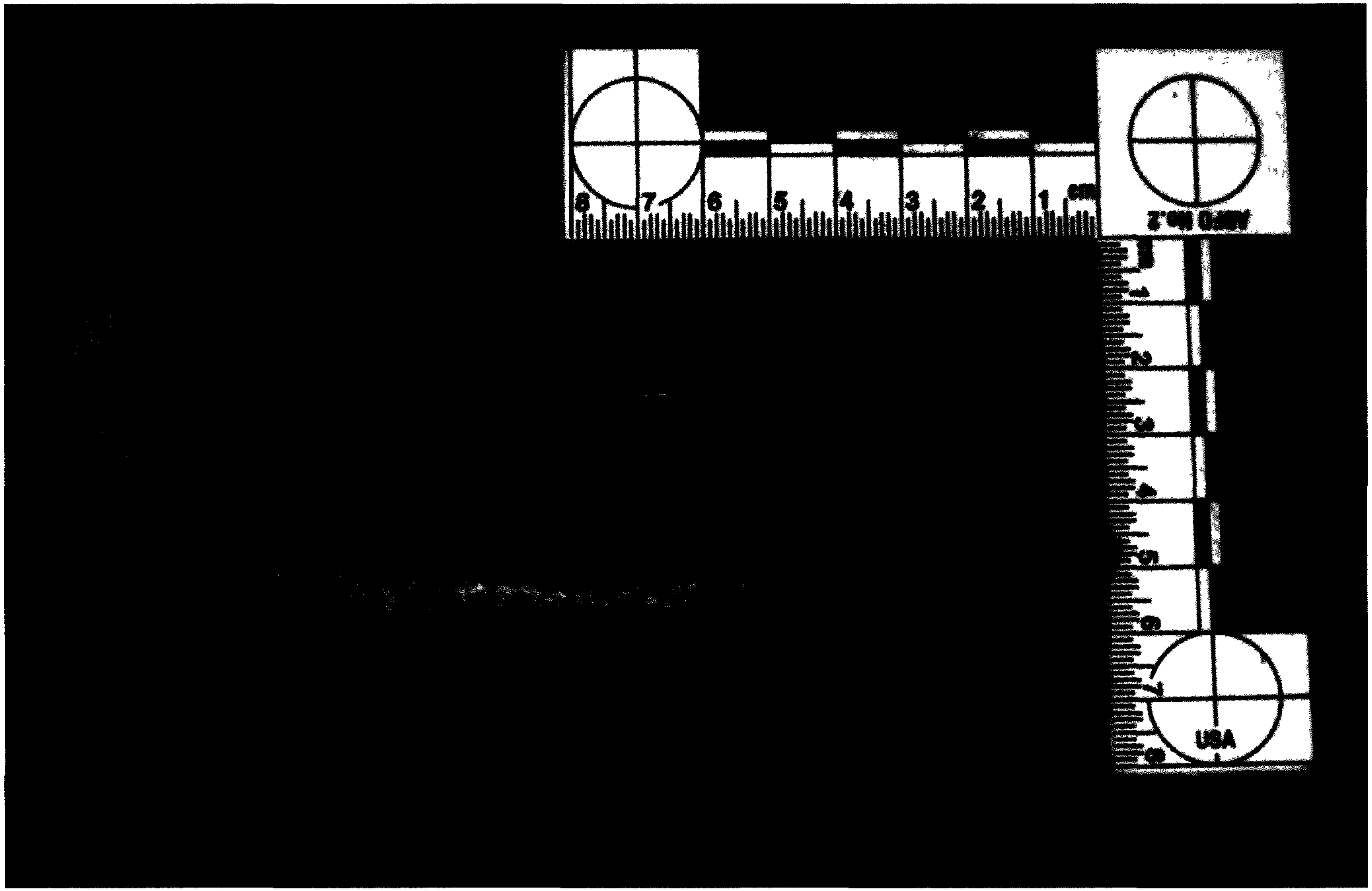

Figure 4.153 A variety of pig vertebrae used in the macroscopic evaluation of colour mimicry.

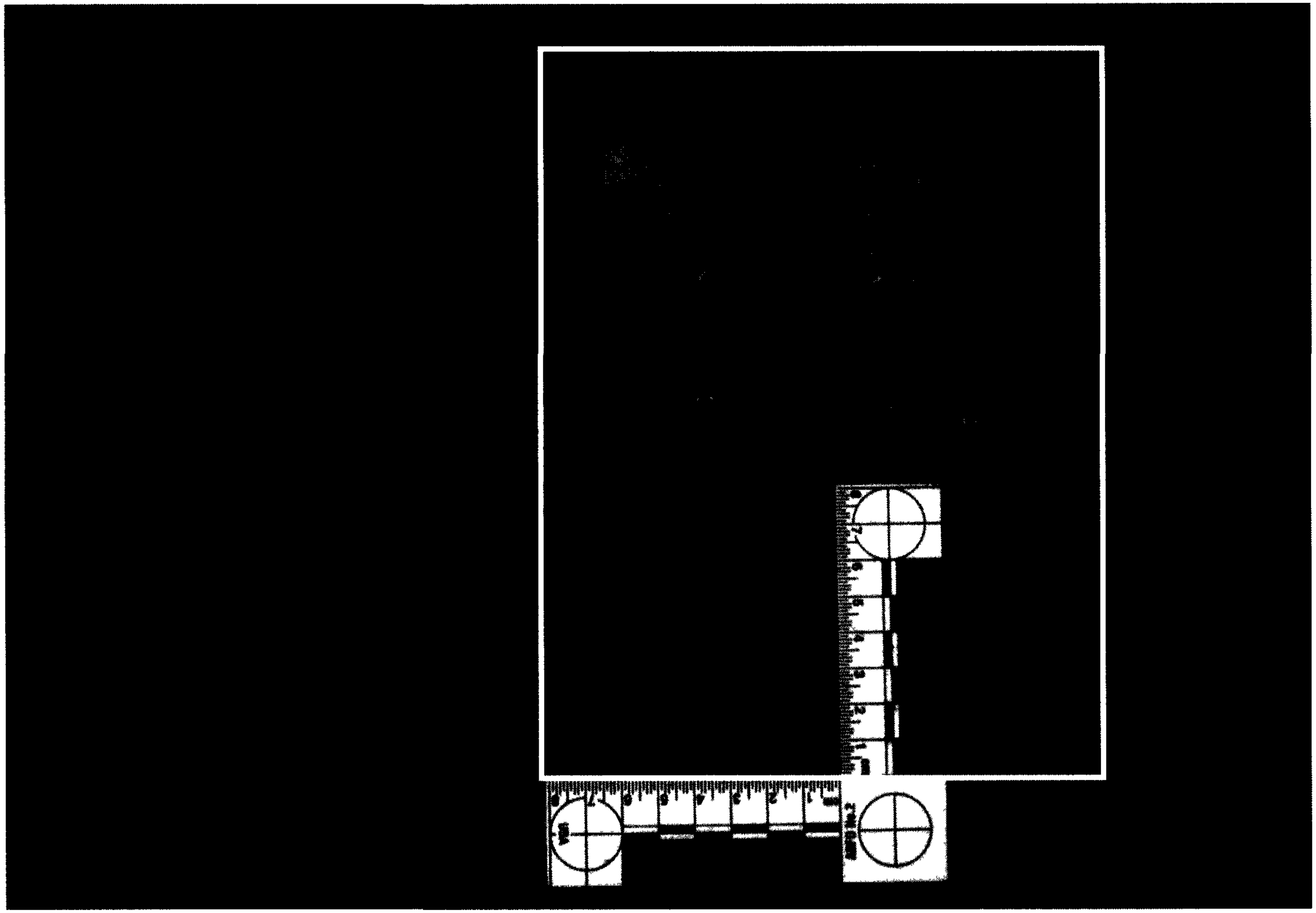

Figure 4.154 A variety of unfused pig innominate bone pieces used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

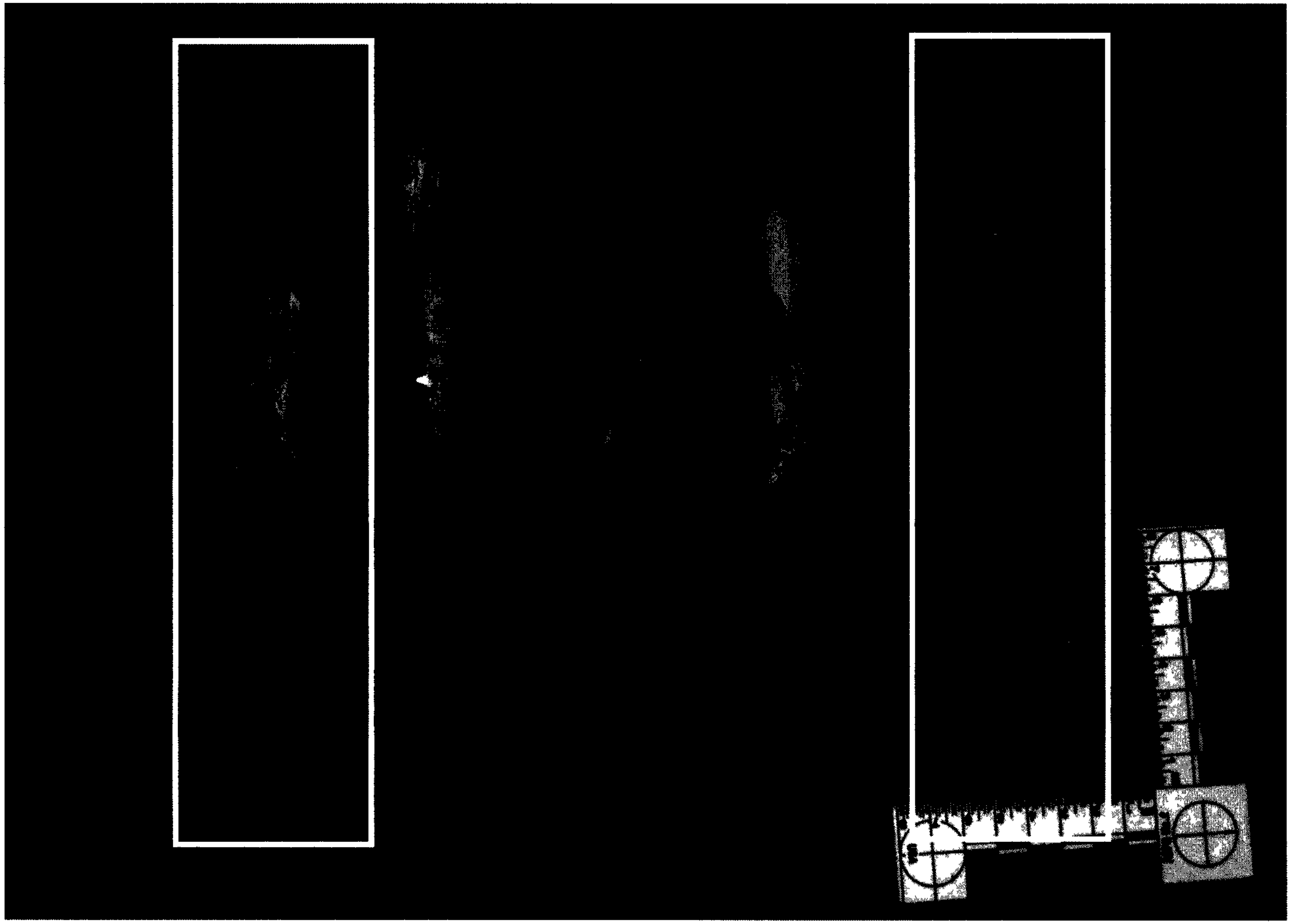

Figure 4.155 A variety of pig femora used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

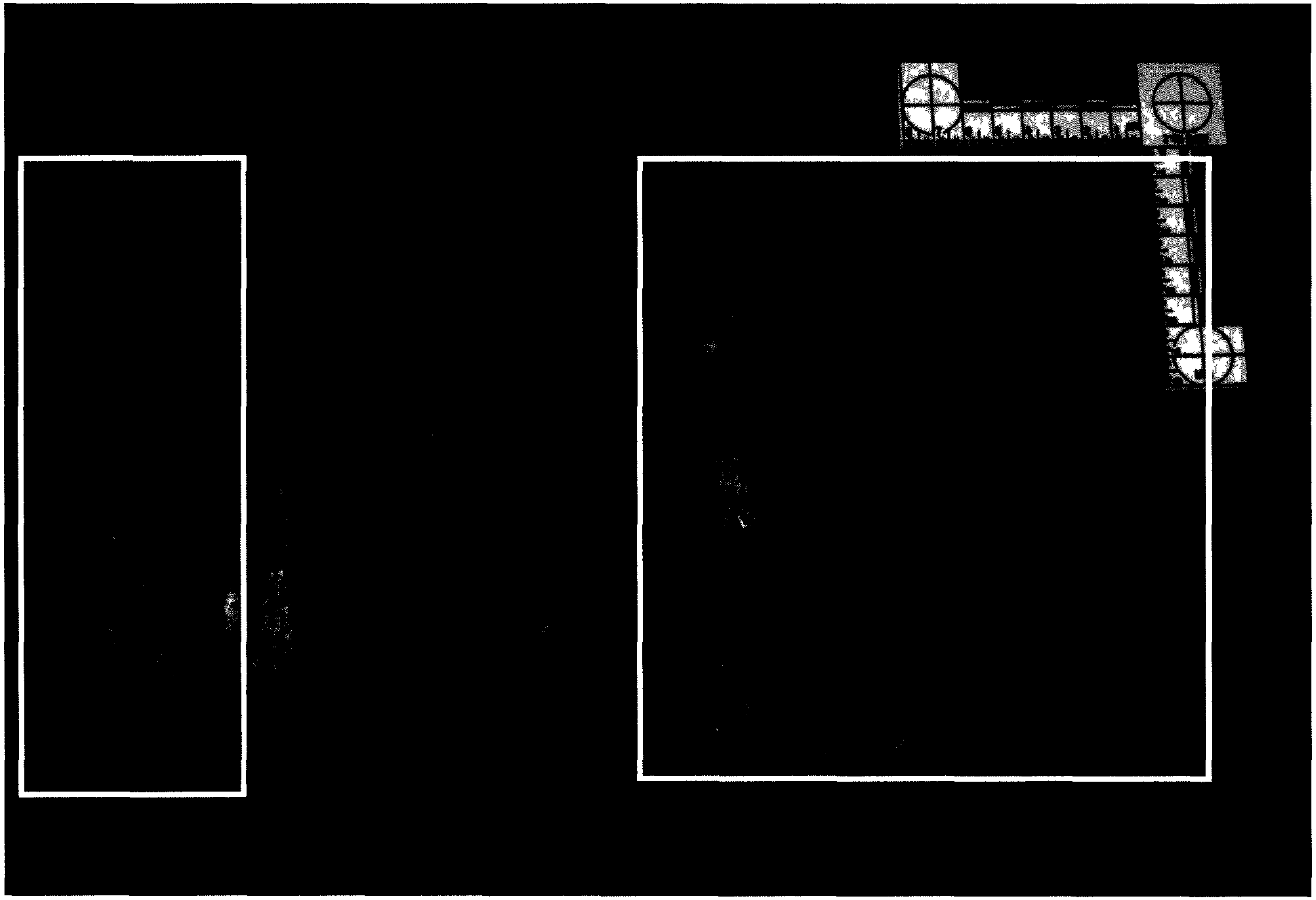

Figure 4.156 A variety of pig tibiae used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

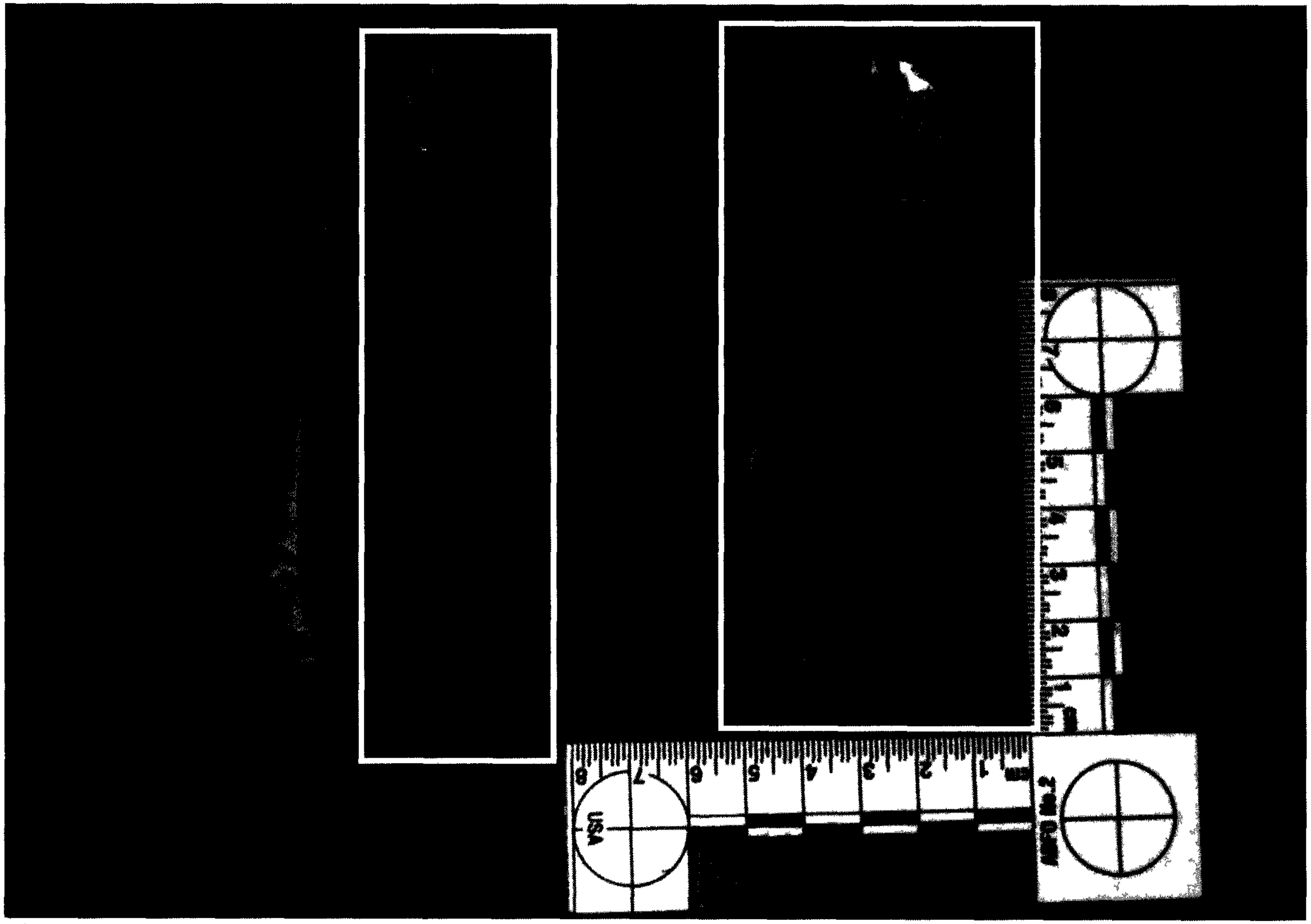

Figure 4.157 A variety of pig fibula used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

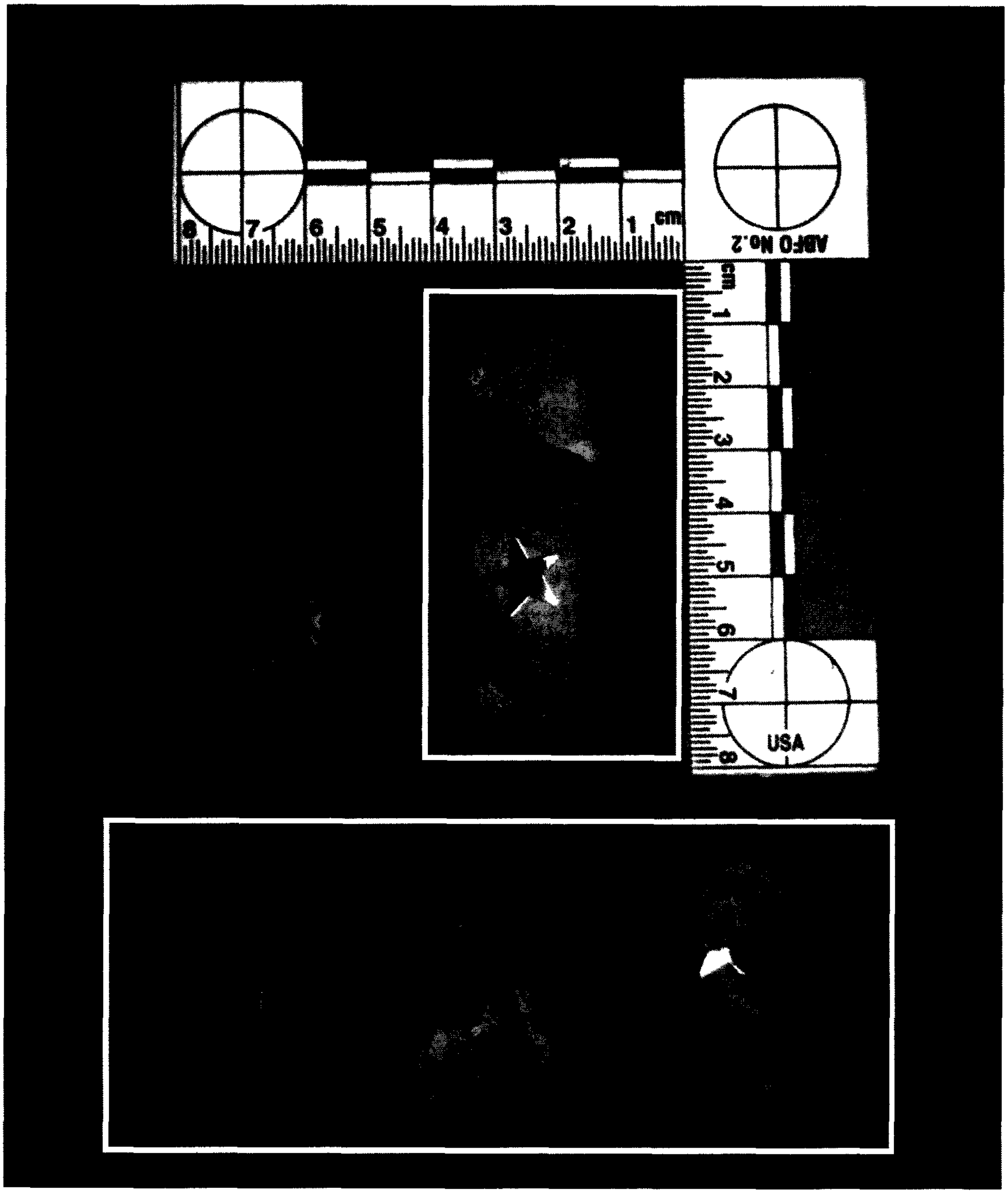

Figure 4.158 A variety of pig calcanei and astraguli used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

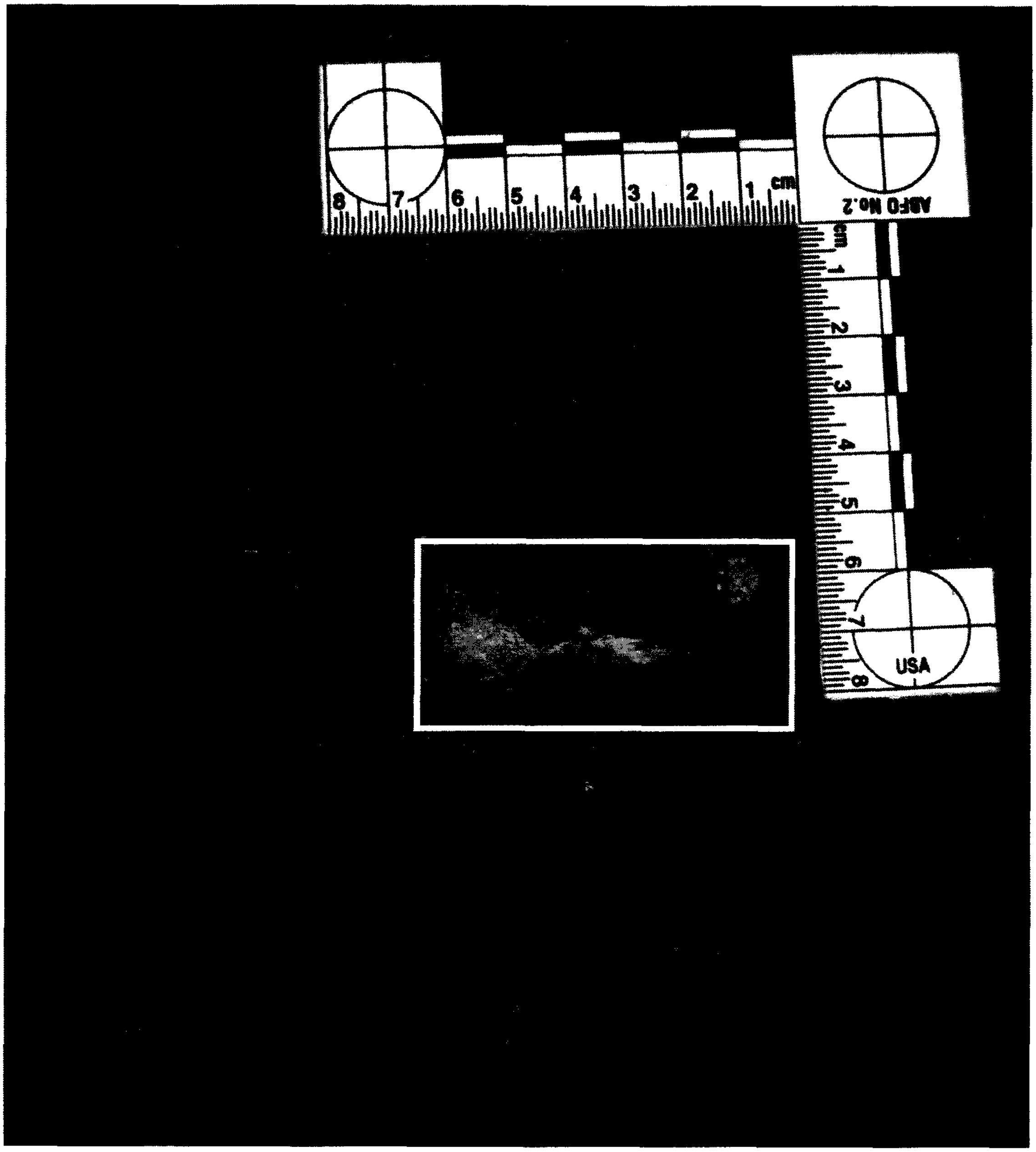

Figure 4.159 A variety of pig metacarpals and metatarsals used in the macroscopic evaluation of colour mimicry. Exhibits outlined in yellow received thermal trauma.

Chapter 5: Discussion

5.1. Reaching a State of Skeletonization by Attainment of 1285 ADD

Skeletonization is qualitatively characterized as one of the final stages of decomposition. It is described as a loss of mummified tissue, leaving behind only remnants of desiccated materials and exposed skeletal elements (Galloway et al. 1989:611). According to Vass et al. (1992), a minimum of 1285 ADD ± 100ADD must be achieved in order to allow the majority of all accessible muscles and fats to be degraded and for remains to reach skeletonization. Similarly, a state of skeletonization is also quantified as a TBS of 27 to 35 points according to the decomposition methodology defined by Megyesi et al. (2005). In the current study, decomposition was tracked until a final ADD value of 1513 was achieved on 25 August 2009 and all pigs achieved a TBS within the 27 to 35 point range. It was at this point that the remains of all eight pigs were removed from the field. Leaving the remains of all eight pigs in the field until a minimum of 1285 ADD was achieved does not contradict the timeline in which the "skeletonization" pig pairs were burned. Both definitions of skeletonization were used in conjunction with one another to assist in determining the appropriate timeframe to remove all eight pig remains from the field.

On 9 July 2009, pigs #5 and #6 were exposed to the simulated brush fire because their TBSs fell within an overall quantitative range of 27 to 35 points, which defines features of skeletonization (Megyesi et al. 2005). More specifically, as mentioned in the Chapter 3, pig #5 had a TBS of 27 points (head and neck: 10, trunk: 9 and limbs: 8) and pig #6 had a TBS of 30 points (head and neck: 12, trunk: 10 and limbs: 7). These point values showed that the remains of pigs #5 and #6 only possessed features consistent with an early stages of skeletonization prior to thermal exposure. Post-burn, on 10 July 2009, the TBS values of each pig were raised two to three points higher, indicating that the remains were still only in an intermediate state of skeletonization and they could decompose further. Caution was taken by the author in reporting these post-burn TBS values because the methodology of Megyesi et al. (2005) did not account for decomposition in burned remains. However, the author still felt it was necessary to use the post-burn TBSs, for all three of the burned pig paired groups, as a guideline to gauge their stage of decomposition and ultimately track their final stages of skeletonization. Furthermore, by leaving the "skeletonization" pig pair out until a minimum of 1285 ADD was reached, it allowed for the other three pig paired groups sufficient exposure to the elements to decompose and exhibit features consistent with skeletonization.

5.2. Burn Pattern Signatures: the Effects of Decomposition and Additional Fuel Sources

5.2.1. Remains in a "Fresh" State of Decomposition

The effects of the brush fires were evaluated at the fresh, advanced and skeletonization stage of decomposition to determine what burn pattern signatures exist for these three stages of decomposition. At the first stage of decomposition, the current author originally postulated that the "fresh" pig paired group would have represented the standard burn pattern signatures that would exist for a pig model. This model was expected to be comparative to the burn pattern signatures outlined by the pugilistic posture in humans, though it would be governed by the physiology and anatomy of the domestic pig. Unfortunately, the first set of brush fires was not sustained long enough to thermally force the flexion of muscles.

The vegetative fine fuels, used to spread the first set of brush fires, were sufficient to catalyze the initial interactions between the brush fires and the flesh of the "fresh" pig paired group. However, the extent of these interactions was limited due to the high content of moisture that was contained within the flesh of the "fresh" pig paired group. The hydrated flesh of the pigs served as a protective barrier that prevented the brush fires from gaining access to body fat. Consequently, once all accessible fine vegetative fuel sources were consumed by the fire, the fire could no longer sustain itself solely on the flesh of the pigs and it self-extinguished. Since the simulated fires were created to mimic brush fires within a controlled environment, they only had the opportunity to consume fine vegetative fuel sources, such as dry grasses or surface scatter. The current author suggests that if medium fuel sources were included in the simulated brush fires, they may have made a significant contribution towards sustaining the fires long enough to allow pigs #3 and #4 to adopt the pugilistic posture.

The brush fires did however cause CGS Level #1 injuries to pigs #3 and #4, though the fire was inadequate to dehydrate and split the skin in order to render or release fat. Level #1 CGS thermal injuries included singeing of body hair and blistering of the epidermis. Blisters possessed well defined circular or ovoid borders and they were consistent with thermal blister descriptions outlined by Pope and Smith (2004:3) as occurring when moisture and gases expand under layers of heated skin. Although, no burn pattern signature evolved for the "fresh" pig pair, recognition must still be given to general thermal trends. Firstly, when freshly decomposed remains are exposed to a brush fire that is supported by fine fuels, they may receive CGS level #1 injuries on their epidermis and likely no heat related skeletal trauma. Secondly, the findings in this study suggest that thermal injuries will be limited to the external aspects of the body when medium vegetative fuel sources are inaccessible or an additional external heat source cannot be consistently applied to a body in order to release more of its fat supply.

5.2.2. Remains in an Advanced Stage of Decomposition

At an advanced stage of decomposition, there was an increase in the amount of living vegetation surrounding the pig cadavers due to seasonal weather conditions. Pigs #7 and #8 also displayed more than 50% of bone exposure in some regions of the body and introduced new fuels in the form of mummified tissues and thick decomposed tissues. The mummified tissues served as an additional fine fuel source to aid in catalyzing the spread and ignitability of the fire. For example, the mummified tissues in the regions of the head, neck and limbs were quickly pyrolized and breached to allow direct contact with the underlying skeletal remains. The thick decomposed tissues, however, had the reverse effect and acted as a barrier between the fire and the skeletal remains. This was similar to the effects of the large mass to surface area ratio of the advanced decomposed remains. When the large mass to surface area ratio was coupled with a lack of direct access to oxygen, it prevented the combustibles from readily igniting or burning rapidly (Ford 1995:16).

Overall, minimal heat related skeletal trauma was found present on the remains of pigs #7 and #8, with the exception of their skulls. These remains were predominantly degreased and, as a result, were not shielded from the turbulent flames of the brush fires. This finding is consistent with the study of Hanson and Cain (2007:1910) which report that greasy bones sizzled and took much longer to darken in colour than degreased bones when added to a fire. Charring within the balance of the remains was predominantly documented on skeletal regions where the simulated brush fires were able to penetrate through the desiccated adipocere, whereas small amounts of calcination were evident in regions of bone that were only protected by mummified tissues. The thermal findings from pigs #7 and #8 were too inconsistent to draw comparative conclusions because of the lack of overlap between the severity of the thermal contact and the location of the injuries. As a result, no concrete burn pattern signatures or predictive burn models could be defined for an advanced stage of decomposition. However, general trends related to thermal injuries are presented and discussed.

The thermal data collected in the current study does suggest that regions of a decomposed body that are minimally protected by mummified tissues and decomposed fluids would be the primary targets for small scale thermal destruction. Thermal injuries within these regions will be consistent with, but not limited to, predominant amounts of charring and moderate amounts of calcination. The current study also suggests minimal heat related skeletal trauma will be found on remains when they are coated in adipocere or decomposed fluids because the coating acts as a protective barrier against the heat of a brush fire.

5.2.3. Remains in a State of Skeletonization

The skeletonized remains of pigs #5 and #6 incurred the most extensive and prominent heat related skeletal trauma in comparison to the other two pig paired groups. This was self-evident as more than 50% of the skeletal remains were in direct contact with the simulated brush fires. Although there was an increase in the amount of living vegetation surrounding the skeletal remains of both pigs, the fires primarily sustained themselves by means of biological fuel sources. Biological fuels were present in the forms of mummified tissues, decomposed fluids and tissues, and bone exposure in more than 50% of all regions of the body. The degreased nature of the skeletal remains acted as a porous and rigid wick for each of the fires and the low mass to surface area ratio of the disarticulated skeletal remains increased the access of oxygen to the fire (DeHaan et al. 1999). Also, the volatile fatty acids of the decomposed fluids served as suitable and accessible fuel source to proliferate the fires (DeHaan 2008). These fuel sources were either accessible on the surface of the terrain or they had leached into the soil beneath the remains. For example, the skeletal remains of pigs #5 were heavily commingled in a viscous adipocere solution that lay on top of the soil, while the mummified tissues and skeletal remains of pig #6 lay on top of the soil that was heavily saturated with decomposed fluids. In both scenarios, the uneven terrain of the semi-wooded forest floor was responsible for determining how the greasy decomposition fluid pooled around the remains. For instance, pooling of decomposed fluids occurred around the posterior aspect of the trunk of pig #5 and around the anterior aspect of the trunk of pig #6. In both cases, these locations coincided with the regions of the pig remains that sustained the most thermal injury.

While both pigs #5 and #6 shared thermal injuries to their posterior and hind limb regions, their primary regions of heat related skeletal trauma differed. Thermal destruction was highly concentrated on the pelvic girdle of pig #5 versus the ribcage of pig #6. Thermal destruction was also focused on the left side of pig #5, whereas it was almost equally distributed to both the left and right sides of pig #6. Consequently, due to these differences, no burn pattern signature could be deduced from the heat related skeletal trauma found on the remains of the "skeletonization" pig paired group.

However, the thermal findings for pigs #5 and #6 reveal that many factors play a role in contributing to the unique and individual burn patterns that manifest on skeletonized remains. This includes the sequence of disarticulation, the orientation of final posture, the variation of the slope of the terrain, and the quality of the biological and vegetative fuel sources. The sequence of disarticulation is an important variable to consider at this stage of decomposition because the small amounts of desiccated or mummified soft tissues that are commonly found commingled with skeletonized remains do not have the same mechanical properties as fresh muscle tissues. When desiccated or mummified soft tissues are exposed to intense heat therapy, they cannot support the same skeletal movements that would result from muscle flexion or tissue shrinkage on articulated remains. Therefore, without reliance on muscle flexion or tissue shrinkage, the sequence of disarticulation and the orientation of final posture play a large role in determining the resulting burn patterns that manifest on the surface of skeletal remains (Bonucci and Graziani 1975; Nicholson 1993:423; Taylor et al. 1995).

5.2.4. Recommendations for the Application of the Thermal Findings and for Future Studies

The current study reports individual thermal injuries within each pig paired group and at each of the three stages of decomposition. Much caution was taken in relaying the significance of these thermal findings due to the lack of overlap between the spatial orientations of the heat related skeletal trauma and the inconsistencies in the severity of the trauma. However, if the general trends of this thermal data are applied to forensic investigations, they may provide insight into determining at what stage of decomposition remains were in prior to contact with a brush fire. This would be of great assistance to law enforcement and other medico-legal experts in determining a PMI.

The results of this descriptive, pilot, study do warrant further testing to increase the confidence and notability of its thermal findings. This study suggests that a larger sample size be used within each stage of decomposition to investigate if the resulting heat related skeletal traumas were due to chance or unique to each of the sampled stages of decomposition. A larger sample size would also illustrate a wider spectrum of thermal injuries that could be sustained at each of the stages of decomposition. This additional information would be helpful when involved with fatal fire investigations in wooded environments because each case scenario is unique to the circumstances of the scene and the conditions of the human remains. The current study also proposes that future experiments be conducted using alternative sources of heat therapy, such as car or house fire settings.

5.3. Macroscopic Surface Colour and Mimicry between Burned and Unburned Remains

In the current study, macroscopic surface colour comparisons were made between staining patterns caused by naturally decomposing muscle tissue on skeletal remains and colour transformations caused by thermal modifications. A total of 99 Munsell colour readings were collected from the thermally treated remains of the "advanced decomposition" and "skeletonization" pig paired groups and 47.5% of the 99 colour readings were determined to be unique to burned remains. These colours represent aspects of thermal modifications that are typically associated with charring and calcination. Shades of black suggest that regions of the skeletal remains reached temperatures between 285-645°C. It also implies that the organic components of the bone were pyrolized and carbonization had occurred. Similarly, shades of bluish blacks and bluish grays indicate that regions of skeletal remains reached temperatures between 650-750°C. Also it is evident that the structural carbonate had been removed from the composition of bone and that calcination had begun (Bonucci and Graziani 1975; Munro et al. 2007; Shipman et al. 1984).

The remaining 52.5% of 99 Munsell colour readings provided the premise for evaluating if mimicry of colour was evident between burned and unburned remains. The author initially proposed that mimicry of colour would occur in two scenarios due to the non-invasive and macroscopic nature of the study. The first scenario incorporated colour mimicry of dark staining between charred remains and staining from either soil interaction or decomposed tissues and fluid. The second scenario included colour mimicry of light staining between calcinated remains and staining from sun bleaching. In the current study, colour mimicry was found in two distinct groupings, though only the first proposed colour mimicry scenario held true.

The first scenario was supported by 23.3% of the 99 Munsell colour readings, represented by shades of brown, black, very dark gray brown and light brownish gray. Shades of brown are commonly associated with thermally treated remains prior to the combustion of their organic components when they are exposed to temperatures reaching approximately 200-300°C (Munro et al. 2007; Shipman et al. 1984). Similarly, thermally treated bone surface colours of black, very dark gray brown, light brownish gray are colours associated with the pyrolysis of organic matter and they occur on bone at temperatures less than 645°C (Shipman et al. 1984).

The second scenario assumed that the light Munsell colour readings from the calcinated remains would only produce matches with colours sourced from sun bleaching, however the 29.2% of the 99 Munsell colour readings indicated otherwise. Light coloured staining made a positive match between all three taphonomic mechanisms: exposure to brush fires, sun bleaching, and soil interaction or decomposed tissue and fluid. This occurred because initial consideration was not given to the solidification of decomposed fats, which produces a lighter staining on the surface of skeletal remains when it dries. What is clearly revealed by the colour data is that all three of these mechanisms are capable of producing the same shading on the surface of skeletal remains. This suggests that even though colour is typically used to distinguish burned from unburned remains, the presence of colour alone cannot be used as an independent indicator of thermal interaction (Shipman et al. 1984). Rather, it must be coupled with other common features of thermal interaction that affect the surface texture of skeletal remains. This includes gross macroscopic surface characteristics, such as cracking, warping, and degrees of calcination (Taylor et al. 1995). Similarly, these physical characteristics must also be coupled with the supplementary information provided from the post-depositional site from which the remains were recovered.

In the mimicry of surface colour and texture evaluation, the author had initial intended to feature the impact that surface texture has on the correct identification of taphonomic mechanisms. However, the three month summer season proved to be an insufficient period of time to produce the exaggerated physical characteristics consistent with extensive weathering. According to Behrensmeyer et al. (1978), a minimum of one year is required to allow cracking or flaking of cortical bone to occur on skeletal remains. This affected the opportunity for the experienced forensic experts to make false identifications during the macroscopic evaluation of mimicry. For instance, experts were able to rely on the small degree of exfoliated charred cortical bone to determine the presence of thermal contact. This was further supported by the 84% and 90% accuracies with which the experts were able to correctly identify the taphonomic mechanisms responsible for staining the surface of the skeletal remains.

5.3.1. Recommendations for the Application of the Mimicry Findings and for Future Studies

Overall, while the current study identifies and inventories colour data that is pertinent to the interpretation of burned remains, it also lists colours that are shared between different taphonomic mechanisms. This was not to suggest that the colours outlined as unique to burned remains or mimicked between different taphonomic mechanisms are the only possible colour readings for burned or weathered remains. Rather these colours represent a broad range of colours that can be featured for burned and weathered remains, as defined by the design of this study. Therefore, this data provides broad insight into deducing if the surface colours, due to decomposition of soft tissue, of skeletal remains found in an outdoor environment are discernable from colours found on burned remains.

The findings from the macroscopic mimicry evaluation, however, warrant further investigation. The current study recommends that future studies provide the sufficient length of time required to allow the natural environment to weather the surface of skeletal remains. This will increase the comparative value of mimicry between weathered and burned remains and it may provide new findings to decipher between burned and unburned remains.

Chapter 6: Conclusion

The current study was conducted in order to make a valid contribution towards research that serves as an aid in the identification of heat induced skeletal remains and the analysis of macroscopic bone modifications. The findings of this research provide insight into understanding how various stages of decomposition affect the fuel source of a brush fire and affect the heat related skeletal trauma that manifests on the surface of remains. This study also identifies standardized colours that are unique to burned remains and common to the taphonomic mechanisms found in an outdoor wooded environment. This study brings to light the fact that mimicry of colour can be expected between burned and unburned remains found in an outdoor environment. More specifically, if surface colour is evaluated in combination with surface texture, there are greater chances of soundly identifying the taphonomic mechanisms responsible for creating discolouration patterns on the surface of the skeletal remains. Collectively, these findings will aid forensic experts by helping to deduce the taphonomic patterns of skeletal remains found in an outdoor environment to determine information about a decedent's post mortem interval.

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APPENDIX A:

Field Data Sheets

Metro-Rural Fire Forensics

DECOMPOSITION TRACKER

SAINT MARY'S UNIVERSITY SINCE 1802

One University. One World. Yours.

Date:____

Max Temperature:________________ Rel. Humidity Max/Min:____________ ADD Score:____________

Min Temperature:________________ Total Precipitation:____________

		Score of Decompositional Phase				
BURN TREATMENT	PIG #	HEAD & NECK	TRUNK	LIMBS	TBS	NOTES
CONTROL	1					
CONTROL	2					
FRESH	3					
FRESH	4					
PARTIALLY SKELETONIZED	5					
PARTIALLY SKELETONIZED	6					
SKELETONIZED	7					
SKELETONIZED	8					

Tricia Fernandes, MSc. Candidate, Saint Mary's University, Supervisor: Dr. Tanya Peckmann

Metro-Rural Fire Forensics

EXPOSURE TO BRUSH FIRE TREATMENT

SAINT MARY'S UNIVERSITY SINCE 1802
One University. One World. Yours.

Date:____

Max Temperature:__________ Relative Humidity:________________ ADD Score:________________

Min Temperature:__________ Total Precipitation:________________ Duration of Fire:____________ FLAME TEMPERATURE:_______

	% TISSUE PRESENT	VISUAL CHARACTERISTICS	BONE EXPOSURE
HEAD & NECK			
TRUNK			
LIMBS			

Tricia Fernandes, MSc. Candidate, Saint Mary's University, Supervisor: Dr. Tanya Peckmann

APPENDIX B:

Field Data

Table E. 1 Decomposition Tracker of Total Body Scores for all eight pigs for the Month of June, including Time Since Death (TSD).

Decomposition Tracker: Total Body Scores for June									
		Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
Date	TSD (days)	PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
02-Jun-09	**0**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
03-Jun-09	1	3	3	3	3	3	3	3	3
04-Jun-09	**2**	**4**	**3**	**3**	**3**	**3**	**5**	**3**	**3**
05-Jun-09	3	5	5	3	3	7	9	3	9
06-Jun-09	**4**	**9**	**9**	**7**	**9**	**9**	**9**	**9**	**9**
07-Jun-09	5	9	9	9	11	9	9	9	9
08-Jun-09	**6**	**9**	**10**	**10**	**12**	**9**	**10**	**10**	**9**
09-Jun-09	7	10	10	10	12	11	13	13	10
10-Jun-09	**8**	**12**	**12**	**12**	**15**	**12**	**15**	**14**	**11**
11-Jun-09	9	12	12	12	15	12	16	15	11
12-Jun-09	**10**	**12**	**12**	**13**	**16**	**13**	**16**	**15**	**12**
13-Jun-09	11	14	14	14	16	14	16	15	12
14-Jun-09	**12**	**13**	**13**	**15**	**17**	**13**	**16**	**15**	**13**
15-Jun-09	13	13	15	16	16	13	16	15	13
16-Jun-09	**14**	**14**	**16**	**16**	**17**	**14**	**17**	**16**	**13**
17-Jun-09	15	14	16	18	17	14	19	16	12
18-Jun-09	**16**	**16**	**16**	**18**	**17**	**18**	**20**	**16**	**14**
19-Jun-09	17	16	17	18	20	18	20	16	16
20-Jun-09	**18**	**17**	**18**	**20**	**21**	**18**	**20**	**17**	**16**
21-Jun-09	19	17	18	20	21	18	21	17	16
22-Jun-09	**20**	**18**	**18**	**20**	**21**	**18**	**21**	**18**	**16**
23-Jun-09	21	19	19	20	21	20	21	18	17
24-Jun-09	**22**	**20**	**21**	**20**	**21**	**21**	**21**	**18**	**18**
25-Jun-09	23	20	21	20	23	23	23	19	19
26-Jun-09	**24**	**20**	**21**	**21**	**23**	**23**	**23**	**19**	**19**
27-Jun-09	25	20	21	21	23	23	23	19	20
28-Jun-09	**26**	**22**	**22**	**22**	**23**	**23**	**24**	**20**	**20**
29-Jun-09	27	22	22	22	23	27	25	20	20
30-Jun-09	**28**	**22**	**24**	**22**	**24**	**27**	**26**	**20**	**21**

Table E. 2 Decomposition Tracker of Total Body Scores for all eight pigs for the Month of July, including Time Since Death (TSD).

Decomposition Tracker: Total Body Scores for July									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
01-Jul-09	**29**	**22**	**24**	**22**	**24**	**27**	**26**	**20**	**21**
02-Jul-09	30	22	24	22	24	27	26	21	21
03-Jul-09	**31**	**22**	**24**	**22**	**24**	**27**	**26**	**21**	**21**
04-Jul-09	32	23	25	24	26	27	26	21	23
05-Jul-09	**33**	**23**	**26**	**24**	**26**	**27**	**26**	**21**	**23**
06-Jul-09	34	23	26	24	26	27	26	21	24
07-Jul-09	**35**	**24**	**26**	**25**	**26**	**27**	**26**	**21**	**24**
08-Jul-09	36	24	27	25	26	27	28	22	24
09-Jul-09	**37**	**24**	**27**	**25**	**26**	**27**	**30**	**24**	**25**
10-Jul-09	38	24	27	25	26	29	33	26	26
11-Jul-09	**39**	**25**	**28**	**25**	**26**	**29**	**33**	**26**	**26**
12-Jul-09	40	25	28	25	26	29	33	26	26
13-Jul-09	**41**	**27**	**28**	**24**	**26**	**29**	**33**	**27**	**26**
14-Jul-09	42	27	28	25	26	29	33	27	26
15-Jul-09	**43**	**27**	**29**	**25**	**26**	**29**	**33**	**27**	**26**
16-Jul-09	44	28	29	25	26	29	33	27	26
17-Jul-09	**45**	**28**	**29**	**26**	**26**	**29**	**33**	**27**	**27**
18-Jul-09	46	28	29	27	27	29	33	27	27
19-Jul-09	**47**	**28**	**29**	**27**	**27**	**30**	**33**	**27**	**27**
20-Jul-09	48	28	29	27	27	30	34	27	28
21-Jul-09	**49**	**28**	**29**	**28**	**27**	**30**	**34**	**27**	**28**
22-Jul-09	50	27	29	28	27	30	34	29	29
23-Jul-09	**51**	**27**	**29**	**29**	**27**	**30**	**34**	**29**	**29**
24-Jul-09	52	27	29	29	27	29	34	29	29
25-Jul-09	**53**	**27**	**29**	**29**	**27**	**29**	**34**	**29**	**29**
26-Jul-09	54	28	29	29	27	30	34	29	29
27-Jul-09	**55**	**28**	**29**	**29**	**27**	**31**	**34**	**29**	**29**
28-Jul-09	56	28	29	29	27	31	34	29	29
29-Jul-09	**57**	**28**	**29**	**29**	**27**	**31**	**34**	**29**	**29**
30-Jul-09	58	28	29	29	27	31	34	29	29
31-Jul-09	**59**	**28**	**29**	**29**	**27**	**31**	**34**	**29**	**29**

Table E. 3 Decomposition Tracker of Total Body Scores for all eight pigs for the Month of August, including Time Since Death (TSD).

Decomposition Tracker: Total Body Scores for August									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
01-Aug-09	**60**	**28**	**29**	**29**	**27**	**31**	**34**	**29**	**29**
02-Aug-09	61	28	29	29	27	31	34	29	29
03-Aug-09	**62**	**28**	**29**	**29**	**27**	**31**	**34**	**29**	**29**
04-Aug-09	63	28	29	29	27	31	34	29	29
05-Aug-09	**64**	**28**	**29**	**29**	**27**	**31**	**35**	**29**	**29**
06-Aug-09	65	28	30	29	27	31	35	29	29
07-Aug-09	**66**	**28**	**30**	**29**	**27**	**31**	**35**	**29**	**29**
08-Aug-09	67	28	30	29	27	31	35	29	29
09-Aug-09	**68**	**28**	**30**	**29**	**27**	**31**	**35**	**29**	**29**
10-Aug-09	69	28	30	29	27	31	35	29	29
11-Aug-09	**70**	**28**	**30**	**29**	**27**	**31**	**35**	**29**	**29**
12-Aug-09	71	28	30	29	27	31	35	29	29
13-Aug-09	**72**	**28**	**30**	**29**	**27**	**31**	**35**	**29**	**29**
14-Aug-09	73	28	30	29	27	32	35	29	29
15-Aug-09	**74**	**28**	**30**	**29**	**27**	**32**	**35**	**29**	**29**
16-Aug-09	75	28	30	29	27	32	35	29	29
17-Aug-09	**76**	**28**	**30**	**29**	**27**	**32**	**35**	**29**	**29**
18-Aug-09	77	28	30	29	27	32	35	29	29
19-Aug-09	**78**	**28**	**30**	**29**	**27**	**32**	**35**	**29**	**29**
20-Aug-09	79	28	30	29	27	32	35	29	29
21-Aug-09	**80**	**28**	**30**	**29**	**27**	**32**	**35**	**29**	**29**
22-Aug-09	81	28	30	29	27	32	35	29	29
23-Aug-09	**82**	-	-	-	-	-	-	-	-
24-Aug-09	83	28	30	29	27	32	35	29	29
25-Aug-09	**84**	**28**	**30**	**29**	**27**	**32**	**35**	**29**	**29**

Table E. 4 Decomposition Tracker of Head & Neck Scores for all eight pigs for the Month of June, including Time Since Death (TSD).

Decomposition Tracker: Head & Neck Scores for June									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
02-Jun-09	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
03-Jun-09	1	1	1	1	1	1	1	1	1
04-Jun-09	**2**	**1**	**1**	**1**	**1**	**1**	**3**	**1**	**1**
05-Jun-09	3	1	1	1	1	1	3	1	3
06-Jun-09	**4**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
07-Jun-09	5	3	3	3	5	3	3	3	3
08-Jun-09	**6**	**3**	**3**	**3**	**5**	**3**	**3**	**3**	**3**
09-Jun-09	7	3	3	3	5	3	6	6	3
10-Jun-09	**8**	**4**	**4**	**4**	**7**	**4**	**7**	**6**	**3**
11-Jun-09	9	4	4	4	7	4	8	7	3
12-Jun-09	**10**	**4**	**4**	**5**	**8**	**5**	**8**	**7**	**4**
13-Jun-09	11	6	6	6	8	6	8	7	4
14-Jun-09	**12**	**5**	**5**	**7**	**8**	**5**	**8**	**7**	**5**
15-Jun-09	13	5	7	7	8	5	8	7	5
16-Jun-09	**14**	**5**	**7**	**7**	**8**	**5**	**8**	**7**	**5**
17-Jun-09	15	5	7	8	8	5	9	7	4
18-Jun-09	**16**	**6**	**7**	**8**	**8**	**7**	**9**	**7**	**5**
19-Jun-09	17	6	8	8	8	7	9	7	6
20-Jun-09	**18**	**6**	**8**	**8**	**8**	**7**	**9**	**8**	**6**
21-Jun-09	19	6	8	8	8	7	9	8	6
22-Jun-09	**20**	**7**	**8**	**8**	**8**	**7**	**9**	**8**	**6**
23-Jun-09	21	8	8	8	8	8	9	8	7
24-Jun-09	**22**	**8**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
25-Jun-09	23	8	8	8	8	10	10	8	8
26-Jun-09	**24**	**8**	**8**	**8**	**8**	**10**	**10**	**8**	**8**
27-Jun-09	25	8	8	8	8	10	10	8	9
28-Jun-09	**26**	**9**	**9**	**9**	**8**	**10**	**10**	**8**	**9**
29-Jun-09	27	9	9	9	8	10	11	8	9
30-Jun-09	**28**	**9**	**9**	**9**	**9**	**10**	**11**	**8**	**9**

Table E. 5 Table E.5 Decomposition Tracker of Head & Neck Scores for all eight pigs for the Month of July, including Time Since Death (TSD).

Decomposition Tracker: Head & Neck Scores for July									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
01-Jul-09	**29**	**9**	**9**	**9**	**9**	**10**	**11**	**8**	**9**
02-Jul-09	30	9	9	9	9	10	11	8	9
03-Jul-09	**31**	**9**	**9**	**9**	**9**	**10**	**11**	**8**	**9**
04-Jul-09	32	9	10	9	10	10	11	8	9
05-Jul-09	**33**	**9**	**10**	**9**	**10**	**10**	**11**	**8**	**9**
06-Jul-09	34	9	10	9	10	10	11	8	9
07-Jul-09	**35**	**9**	**10**	**9**	**10**	**10**	**11**	**8**	**9**
08-Jul-09	36	9	10	9	10	10	11	9	9
09-Jul-09	**37**	**9**	**10**	**9**	**10**	**10**	**12**	**9**	**10**
10-Jul-09	38	9	10	9	10	12	13	9	11
11-Jul-09	**39**	**9**	**10**	**9**	**10**	**12**	**13**	**9**	**11**
12-Jul-09	40	9	10	9	10	12	13	9	11
13-Jul-09	**41**	**11**	**10**	**9**	**10**	**12**	**13**	**10**	**11**
14-Jul-09	42	11	10	9	10	12	13	10	11
15-Jul-09	**43**	**11**	**11**	**9**	**10**	**12**	**13**	**10**	**11**
16-Jul-09	44	11	11	9	10	12	13	10	11
17-Jul-09	**45**	**11**	**11**	**9**	**10**	**12**	**13**	**10**	**11**
18-Jul-09	46	11	11	10	11	12	13	10	11
19-Jul-09	**47**	**11**	**11**	**10**	**11**	**12**	**13**	**10**	**11**
20-Jul-09	48	11	11	10	11	12	13	10	12
21-Jul-09	**49**	**11**	**11**	**11**	**11**	**12**	**13**	**10**	**12**
22-Jul-09	50	11	11	11	11	12	13	12	12
23-Jul-09	**51**	**11**	**11**	**11**	**11**	**12**	**13**	**12**	**12**
24-Jul-09	52	11	11	11	11	12	13	12	12
25-Jul-09	**53**	**11**	**11**	**11**	**11**	**12**	**13**	**12**	**12**
26-Jul-09	54	11	11	11	11	12	13	12	12
27-Jul-09	**55**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
28-Jul-09	56	11	11	11	11	13	13	12	12
29-Jul-09	**57**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
30-Jul-09	58	11	11	11	11	13	13	12	12
31-Jul-09	**59**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**

Table E. 6 Decomposition Tracker of Head & Neck Scores for all eight pigs for the Month of August, including Time Since Death (TSD).

Decomposition Tracker: Head & Neck Scores for August									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
01-Aug-09	**60**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
02-Aug-09	61	11	11	11	11	13	13	12	12
03-Aug-09	**62**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
04-Aug-09	63	11	11	11	11	13	13	12	12
05-Aug-09	**64**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
06-Aug-09	65	11	11	11	11	13	13	12	12
07-Aug-09	**66**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
08-Aug-09	67	11	11	11	11	13	13	12	12
09-Aug-09	**68**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
10-Aug-09	69	11	11	11	11	13	13	12	12
11-Aug-09	**70**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
12-Aug-09	71	11	11	11	11	13	13	12	12
13-Aug-09	**72**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
14-Aug-09	73	11	11	11	11	13	13	12	12
15-Aug-09	**74**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
16-Aug-09	75	11	11	11	11	13	13	12	12
17-Aug-09	**76**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
18-Aug-09	77	11	11	11	11	13	13	12	12
19-Aug-09	**78**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
20-Aug-09	79	11	11	11	11	13	13	12	12
21-Aug-09	**80**	**11**	**11**	**11**	**11**	**13**	**13**	**12**	**12**
22-Aug-09	81	11	11	11	11	13	13	12	12
23-Aug-09	**82**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
24-Aug-09	83	11	11	11	11	13	13	12	12
25-Aug-09	**84**	11	11	11	11	13	13	12	12

Table E. 7 Decomposition Tracker of Trunk Scores for all eight pigs for the Month of June, including Time Since Death (TSD).

Decomposition Tracker: Trunk Scores for June									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
02-Jun-09	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
03-Jun-09	1	1	1	1	1	1	1	1	1
04-Jun-09	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
05-Jun-09	3	3	1	1	1	3	3	1	3
06-Jun-09	**4**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
07-Jun-09	5	3	3	3	3	3	3	3	3
08-Jun-09	**6**	**3**	**4**	**4**	**4**	**3**	**4**	**4**	**3**
09-Jun-09	7	4	4	4	4	4	4	4	4
10-Jun-09	**8**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
11-Jun-09	9	4	4	4	4	4	4	4	4
12-Jun-09	**10**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
13-Jun-09	11	4	4	4	4	4	4	4	4
14-Jun-09	**12**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
15-Jun-09	13	4	4	4	4	4	4	4	4
16-Jun-09	**14**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
17-Jun-09	15	4	4	5	4	4	5	4	4
18-Jun-09	**16**	**5**	**4**	**5**	**4**	**6**	**6**	**4**	**4**
19-Jun-09	17	5	5	5	7	6	6	4	5
20-Jun-09	**18**	**6**	**5**	**6**	**7**	**6**	**6**	**4**	**5**
21-Jun-09	19	6	5	6	7	6	6	4	5
22-Jun-09	**20**	**6**	**5**	**6**	**7**	**6**	**6**	**5**	**5**
23-Jun-09	21	6	5	6	7	6	6	5	5
24-Jun-09	**22**	**6**	**7**	**6**	**7**	**7**	**6**	**5**	**5**
25-Jun-09	23	6	7	6	7	7	7	6	6
26-Jun-09	**24**	**6**	**7**	**7**	**7**	**7**	**7**	**6**	**6**
27-Jun-09	25	6	7	7	7	7	7	6	6
28-Jun-09	**26**	**6**	**7**	**7**	**7**	**7**	**7**	**7**	**6**
29-Jun-09	27	6	7	7	7	9	7	7	6
30-Jun-09	**28**	**6**	**7**	**7**	**7**	**9**	**8**	**7**	**6**

Table E. 8 Decomposition Tracker of Trunk Scores for all eight pigs for the Month of July, including Time Since Death (TSD).

Decomposition Tracker: Trunk Scores for July									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
01-Jul-09	**29**	**6**	**7**	**7**	**7**	**9**	**8**	**7**	**6**
02-Jul-09	30	6	7	7	7	9	8	7	6
03-Jul-09	**31**	**6**	**7**	**7**	**7**	**9**	**8**	**7**	**6**
04-Jul-09	32	7	7	8	8	9	8	7	8
05-Jul-09	**33**	**7**	**8**	**8**	**8**	**9**	**8**	**7**	**8**
06-Jul-09	34	7	8	8	8	9	8	7	8
07-Jul-09	**35**	**8**	**8**	**8**	**8**	**9**	**8**	**7**	**8**
08-Jul-09	36	8	9	8	8	9	10	7	8
09-Jul-09	**37**	**8**	**9**	**8**	**8**	**9**	**10**	**8**	**8**
10-Jul-09	38	8	9	8	8	9	11	9	8
11-Jul-09	**39**	**9**	**10**	**8**	**8**	**9**	**11**	**9**	**8**
12-Jul-09	40	9	10	8	8	9	11	9	8
13-Jul-09	**41**	**9**	**10**	**7**	**8**	**9**	**11**	**9**	**8**
14-Jul-09	42	9	10	8	8	9	11	9	8
15-Jul-09	**43**	**9**	**10**	**8**	**8**	**9**	**11**	**9**	**8**
16-Jul-09	44	10	10	8	8	9	11	9	8
17-Jul-09	**45**	**10**	**10**	**9**	**8**	**9**	**11**	**9**	**8**
18-Jul-09	46	10	10	9	8	9	11	9	8
19-Jul-09	**47**	**10**	**10**	**9**	**8**	**10**	**11**	**9**	**8**
20-Jul-09	48	10	10	9	8	10	12	9	8
21-Jul-09	**49**	**10**	**10**	**9**	**8**	**10**	**12**	**9**	**8**
22-Jul-09	50	9	10	9	8	10	12	9	9
23-Jul-09	**51**	**9**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
24-Jul-09	52	9	10	10	8	9	12	9	9
25-Jul-09	**53**	**9**	**10**	**10**	**8**	**9**	**12**	**9**	**9**
26-Jul-09	54	10	10	10	8	10	12	9	9
27-Jul-09	**55**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
28-Jul-09	56	10	10	10	8	10	12	9	9
29-Jul-09	**57**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
30-Jul-09	58	10	10	10	8	10	12	9	9
31-Jul-09	**59**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**

Table E. 9 Decomposition Tracker of Trunk Scores for all eight pigs for the Month of August, including Time Since Death (TSD).

Decomposition Tracker: Trunk Scores for August									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
01-Aug-09	**60**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
02-Aug-09	61	10	10	10	8	10	12	9	9
03-Aug-09	**62**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
04-Aug-09	63	10	10	10	8	10	12	9	9
05-Aug-09	**64**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
06-Aug-09	65	10	10	10	8	10	12	9	9
07-Aug-09	**66**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
08-Aug-09	67	10	10	10	8	10	12	9	9
09-Aug-09	**68**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
10-Aug-09	69	10	10	10	8	10	12	9	9
11-Aug-09	**70**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
12-Aug-09	71	10	10	10	8	10	12	9	9
13-Aug-09	**72**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
14-Aug-09	73	10	10	10	8	10	12	9	9
15-Aug-09	**74**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
16-Aug-09	75	10	10	10	8	10	12	9	9
17-Aug-09	**76**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
18-Aug-09	77	10	10	10	8	10	12	9	9
19-Aug-09	**78**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
20-Aug-09	79	10	10	10	8	10	12	9	9
21-Aug-09	**80**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**
22-Aug-09	81	10	10	10	8	10	12	9	9
23-Aug-09	**82**	-	-	-	-	-	-	-	-
24-Aug-09	83	10	10	10	8	10	12	9	9
25-Aug-09	**84**	**10**	**10**	**10**	**8**	**10**	**12**	**9**	**9**

Table E. 10 Decomposition Tracker of Limb Scores for all eight pigs for the Month of June, including Time Since Death (TSD).

Decomposition Tracker: Limb Scores for June									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
02-Jun-09	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
03-Jun-09	1	1	1	1	1	1	1	1	1
04-Jun-09	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
05-Jun-09	3	1	3	1	1	3	3	1	3
06-Jun-09	**4**	**3**	**3**	**1**	**3**	**3**	**3**	**3**	**3**
07-Jun-09	5	3	3	3	3	3	3	3	3
08-Jun-09	**6**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
09-Jun-09	7	3	3	3	3	4	3	3	3
10-Jun-09	**8**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
11-Jun-09	9	4	4	4	4	4	4	4	4
12-Jun-09	**10**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
13-Jun-09	11	4	4	4	4	4	4	4	4
14-Jun-09	**12**	**4**	**4**	**4**	**5**	**4**	**4**	**4**	**4**
15-Jun-09	13	4	4	5	4	4	4	4	4
16-Jun-09	**14**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**4**
17-Jun-09	15	5	5	5	5	5	5	5	4
18-Jun-09	**16**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
19-Jun-09	17	5	4	5	5	5	5	5	5
20-Jun-09	**18**	**5**	**5**	**6**	**6**	**5**	**5**	**5**	**5**
21-Jun-09	19	5	5	6	6	5	6	5	5
22-Jun-09	**20**	**5**	**5**	**6**	**6**	**5**	**6**	**5**	**5**
23-Jun-09	21	5	6	6	6	6	6	5	5
24-Jun-09	**22**	**6**	**6**	**6**	**6**	**6**	**6**	**5**	**5**
25-Jun-09	23	6	6	6	8	6	6	5	5
26-Jun-09	**24**	**6**	**6**	**6**	**8**	**6**	**6**	**5**	**5**
27-Jun-09	25	6	6	6	8	6	6	5	5
28-Jun-09	**26**	**7**	**6**	**6**	**8**	**6**	**7**	**5**	**5**
29-Jun-09	27	7	6	6	8	8	7	5	5
30-Jun-09	**28**	**7**	**8**	**6**	**8**	**8**	**7**	**5**	**6**

Table E. 11 Decomposition Tracker of Limb Scores for all eight pigs for the Month of July, including Time Since Death (TSD).

Decomposition Tracker: Limb Scores for July									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
01-Jul-09	**29**	**7**	**8**	**6**	**8**	**8**	**7**	**5**	**6**
02-Jul-09	30	7	8	6	8	8	7	6	6
03-Jul-09	**31**	**7**	**8**	**6**	**8**	**8**	**7**	**6**	**6**
04-Jul-09	32	7	8	7	8	8	7	6	6
05-Jul-09	**33**	**7**	**8**	**7**	**8**	**8**	**7**	**6**	**6**
06-Jul-09	34	7	8	7	8	8	7	6	7
07-Jul-09	**35**	**7**	**8**	**8**	**8**	**8**	**7**	**6**	**7**
08-Jul-09	36	7	8	8	8	8	7	6	7
09-Jul-09	**37**	**7**	**8**	**8**	**8**	**8**	**8**	**7**	**7**
10-Jul-09	38	7	8	8	8	8	9	8	7
11-Jul-09	**39**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**7**
12-Jul-09	40	7	8	8	8	8	9	8	7
13-Jul-09	**41**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**7**
14-Jul-09	42	7	8	8	8	8	9	8	7
15-Jul-09	**43**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**7**
16-Jul-09	44	7	8	8	8	8	9	8	7
17-Jul-09	**45**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
18-Jul-09	46	7	8	8	8	8	9	8	8
19-Jul-09	**47**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
20-Jul-09	48	7	8	8	8	8	9	8	8
21-Jul-09	**49**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
22-Jul-09	50	7	8	8	8	8	9	8	8
23-Jul-09	**51**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
24-Jul-09	52	7	8	8	8	8	9	8	8
25-Jul-09	**53**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
26-Jul-09	54	7	8	8	8	8	9	8	8
27-Jul-09	**55**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
28-Jul-09	56	7	8	8	8	8	9	8	8
29-Jul-09	**57**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
30-Jul-09	58	7	8	8	8	8	9	8	8
31-Jul-09	**59**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**

Table E. 12 Decomposition Tracker of Limb Scores for all eight pigs for the Month of August, including Time Since Death (TSD).

Decomposition Tracker: Limb Scores for August									
Date	TSD (days)	Control Pair		Fresh Pair		Skeletonization Pair		Advanced Decomp Pair	
		PIG #1	PIG #2	PIG #3	PIG #4	PIG #5	PIG #6	PIG #7	PIG #8
01-Aug-09	**60**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
02-Aug-09	61	7	8	8	8	8	9	8	8
03-Aug-09	**62**	**7**	**8**	**8**	**8**	**8**	**9**	**8**	**8**
04-Aug-09	63	7	8	8	8	8	9	8	8
05-Aug-09	**64**	**7**	**8**	**8**	**8**	**8**	**10**	**8**	**8**
06-Aug-09	65	7	9	8	8	8	10	8	8
07-Aug-09	**66**	**7**	**9**	**8**	**8**	**8**	**10**	**8**	**8**
08-Aug-09	67	7	9	8	8	8	10	8	8
09-Aug-09	**68**	**7**	**9**	**8**	**8**	**8**	**10**	**8**	**8**
10-Aug-09	69	7	9	8	8	8	10	8	8
11-Aug-09	**70**	**7**	**9**	**8**	**8**	**8**	**10**	**8**	**8**
12-Aug-09	71	7	9	8	8	8	10	8	8
13-Aug-09	**72**	**7**	**9**	**8**	**8**	**8**	**10**	**8**	**8**
14-Aug-09	73	7	9	8	8	9	10	8	8
15-Aug-09	**74**	**7**	**9**	**8**	**8**	**9**	**10**	**8**	**8**
16-Aug-09	75	7	9	8	8	9	10	8	8
17-Aug-09	**76**	**7**	**9**	**8**	**8**	**9**	**10**	**8**	**8**
18-Aug-09	77	7	9	8	8	9	10	8	8
19-Aug-09	**78**	**7**	**9**	**8**	**8**	**9**	**10**	**8**	**8**
20-Aug-09	79	7	9	8	8	9	10	8	8
21-Aug-09	**80**	**7**	**9**	**8**	**8**	**9**	**10**	**8**	**8**
22-Aug-09	81	7	9	8	8	9	10	8	8
23-Aug-09	**82**	-	-	-	-	-	-	-	-
24-Aug-09	83	7	9	8	8	9	10	8	8
25-Aug-09	**84**	**7**	**9**	**8**	**8**	**9**	**10**	**8**	**8**

Table E. 13 Comparison of Total Body Scores (TBS), Accumulated Degree Days (ADD), and Total Precipitation for the month of June in relation to Time Since Death (TSD).

Comparison of Total Body Scores, Accumulated Degree Days and Total Precipitation for June											
TSD (days)	Date	ADD Score	Rain (mm)	CONTROL PAIR		FRESH PAIR		ADVANCED DECOMP PAIR		SKELETONIZED PAIR	
				PIG #1 TBS	PIG #2 TBS	PIG #3 TBS	PIG #4 TBS	PIG #7 TBS	PIG #8 TBS	PIG #5 TBS	PIG #6 TBS
0	**02-Jun-09**	**14.5**	**TRACE**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
1	03-Jun-09	29.2	0	3	3	3	3	3	3	3	3
2	**04-Jun-09**	**44.9**	**0**	**4**	**3**	**3**	**3**	**3**	**3**	**3**	**5**
3	05-Jun-09	59.3	0	5	5	3	3	3	9	7	9
4	**06-Jun-09**	**71.5**	**6.6**	**9**	**9**	**7**	**9**	**9**	**9**	**9**	**9**
5	07-Jun-09	87.4	0	9	9	9	11	9	9	9	9
6	**08-Jun-09**	**101**	**0.4**	**9**	**10**	**10**	**12**	**10**	**9**	**9**	**10**
7	09-Jun-09	113	0	10	10	10	12	13	10	11	13
8	**10-Jun-09**	**122**	**1.5**	**12**	**12**	**12**	**15**	**14**	**11**	**12**	**15**
9	11-Jun-09	134	11.8	12	12	12	15	15	11	12	16
10	**12-Jun-09**	**149**	**26.2**	**12**	**12**	**13**	**16**	**15**	**12**	**13**	**16**
11	13-Jun-09	163	TRACE	14	14	14	16	15	12	14	16
12	**14-Jun-09**	**178**	**0**	**13**	**13**	**15**	**17**	**15**	**13**	**13**	**16**
13	15-Jun-09	191	0	13	15	16	16	15	13	13	16
14	**16-Jun-09**	**203**	**0**	**14**	**16**	**16**	**17**	**16**	**13**	**14**	**17**
15	17-Jun-09	217	0	14	16	18	17	16	12	14	19
16	**18-Jun-09**	**234**	**0**	**16**	**16**	**18**	**17**	**16**	**14**	**18**	**20**
17	19-Jun-09	251	0	16	17	18	20	16	16	18	20

Table E. 13 (cont'd) Comparison of Total Body Scores (TBS), Accumulated Degree Days (ADD), and Total Precipitation for the month of June in relation to Time Since Death (TSD).

Comparison of Total Body Scores, Accumulated Degree Days and Total Precipitation for June											
TSD		ADD	Rain	CONTROL PAIR		FRESH PAIR		ADVANCED DECOMP PAIR		SKELETONIZED PAIR	
(days)	Date	Score	(mm)	PIG #1 TBS	PIG #2 TBS	PIG #3 TBS	PIG #4 TBS	PIG #7 TBS	PIG #8 TBS	PIG #5 TBS	PIG #6 TBS
18	**20-Jun-09**	**269**	**6.9**	**17**	**18**	**20**	**21**	**17**	**16**	**18**	**20**
19	21-Jun-09	284	19.9	17	18	20	21	17	16	18	21
20	**22-Jun-09**	**299**	**19.8**	**18**	**18**	**20**	**21**	**18**	**16**	**18**	**21**
21	23-Jun-09	318	15.7	19	19	20	21	18	17	20	21
22	**24-Jun-09**	**337**	**TRACE**	**20**	**21**	**20**	**21**	**18**	**18**	**21**	**21**
23	25-Jun-09	359	TRACE	20	21	20	23	19	19	23	23
24	**26-Jun-09**	**379**	**0**	**20**	**21**	**21**	**23**	**19**	**19**	**23**	**23**
25	27-Jun-09	398	0	20	21	21	23	19	20	23	23
26	**28-Jun-09**	**415**	**0.3**	**22**	**22**	**22**	**23**	**20**	**20**	**23**	**24**
27	29-Jun-09	432	31.9	22	22	22	23	20	20	27	25
28	**30-Jun-09**	**452**	**2.7**	**22**	**24**	**22**	**24**	**20**	**21**	**27**	**26**

Table E. 14 Comparison of Total Body Scores (TBS), Accumulated Degree Days (ADD), and Total Precipitation for the month of July in relation to Time Since Death (TSD).

Comparison of Total Body Scores, Accumulated Degree Days and Total Precipitation for July											
TSD		ADD	Rain	CONTROL PAIR		FRESH PAIR		ADVANCED DECOMP PAIR		SKELETONIZED PAIR	
(days)	Date	Score	(mm)	PIG #1 TBS	PIG #2 TBS	PIG #3 TBS	PIG #4 TBS	PIG #7 TBS	PIG #8 TBS	PIG #5 TBS	PIG #6 TBS
29	**01-Jul-09**	**469**	**1**	**22**	**24**	**22**	**24**	**20**	**21**	**27**	**26**
30	02-Jul-09	484	TRACE	22	24	22	24	21	21	27	26
31	**03-Jul-09**	**500**	**TRACE**	**22**	**24**	**22**	**24**	**21**	**21**	**27**	**26**
32	04-Jul-09	517	2	23	25	24	26	21	23	27	26
33	**05-Jul-09**	**534**	**TRACE**	**23**	**26**	**24**	**26**	**21**	**23**	**27**	**26**
34	06-Jul-09	547	TRACE	23	26	24	26	21	24	27	26
35	**07-Jul-09**	**558**	**TRACE**	**24**	**26**	**25**	**26**	**21**	**24**	**27**	**26**
36	08-Jul-09	570	0	24	27	25	26	22	24	27	28
37	**09-Jul-09**	**585**	**0**	**24**	**27**	**25**	**26**	**24**	**25**	**27**	**30**
38	10-Jul-09	602	0	24	27	25	26	26	26	29	33
39	**11-Jul-09**	**619**	**0**	**25**	**28**	**25**	**26**	**26**	**26**	**29**	**33**
40	12-Jul-09	635	3.2	25	28	25	26	26	26	29	33
41	**13-Jul-09**	**653**	**0.6**	**27**	**28**	**24**	**26**	**27**	**26**	**29**	**33**
42	14-Jul-09	670	TRACE	27	28	25	26	27	26	29	33
43	**15-Jul-09**	**685**	**1.9**	**27**	**29**	**25**	**26**	**27**	**26**	**29**	**33**
44	16-Jul-09	701	0.3	28	29	25	26	27	26	29	33
45	**17-Jul-09**	**720**	**TRACE**	**28**	**29**	**26**	**26**	**27**	**27**	**29**	**33**

Table E.14 (cont'd) Comparison of Total Body Scores (TBS), Accumulated Degree Days (ADD), and Total Precipitation for the month of July in relation to Time Since Death (TSD).

Comparison of Total Body Scores, Accumulated Degree Days and Total Precipitation for July											
TSD		ADD	Rain	CONTROL PAIR		FRESH PAIR		ADVANCED DECOMP PAIR		SKELETONIZED PAIR	
(days)	Date	Score	(mm)	PIG #1 TBS	PIG #2 TBS	PIG #3 TBS	PIG #4 TBS	PIG #7 TBS	PIG #8 TBS	PIG #5 TBS	PIG #6 TBS
46	18-Jul-09	738	10.9	28	29	27	27	27	27	29	33
47	19-Jul-09	759	0	28	29	27	27	27	27	30	33
48	20-Jul-09	779	0	28	29	27	27	27	28	30	34
49	21-Jul-09	798	TRACE	28	29	28	27	27	28	30	34
50	22-Jul-09	817	26	27	29	28	27	29	29	30	34
51	23-Jul-09	834	0.5	27	29	29	27	29	29	30	34
52	24-Jul-09	849	19.8	27	29	29	27	29	29	29	34
53	25-Jul-09	868	0.3	27	29	29	27	29	29	29	34
54	26-Jul-09	889	TRACE	28	29	29	27	29	29	30	34
55	27-Jul-09	910	TRACE	28	29	29	27	29	29	31	34
56	28-Jul-09	932	TRACE	28	29	29	27	29	29	31	34
57	29-Jul-09	954	0	28	29	29	27	29	29	31	34
58	30-Jul-09	975	4.5	28	29	29	27	29	29	31	34
59	31-Jul-09	997	TRACE	28	29	29	27	29	29	31	34

Table E. 15 Comparison of Total Body Scores (TBS), Accumulated Degree Days (ADD), and Total Precipitation for the month of August in relation to Time Since Death (TSD).

Comparison of Total Body Scores, Accumulated Degree Days and Total Precipitation for August											
TSD (days)	Date	ADD Score	Rain (mm)	CONTROL PAIR		FRESH PAIR		ADVANCED DECOMP PAIR		SKELETONIZED PAIR	
				PIG #1 TBS	PIG #2 TBS	PIG #3 TBS	PIG #4 TBS	PIG #7 TBS	PIG #8 TBS	PIG #5 TBS	PIG #6 TBS
60	**01-Aug-09**	**1018**	**TRACE**	**28**	**29**	**29**	**27**	**29**	**29**	**31**	**34**
61	02-Aug-09	1039	0	28	29	29	27	29	29	31	34
62	**03-Aug-09**	**1060**	**13.9**	**28**	**29**	**29**	**27**	**29**	**29**	**31**	**34**
63	04-Aug-09	1081	0	28	29	29	27	29	29	31	34
64	**05-Aug-09**	**1102**	**0**	**28**	**29**	**29**	**27**	**29**	**29**	**31**	**35**
65	06-Aug-09	1124	TRACE	28	30	29	27	29	29	31	35
66	**07-Aug-09**	**1143**	**2.4**	**28**	**30**	**29**	**27**	**29**	**29**	**31**	**35**
67	08-Aug-09	1160	0	28	30	29	27	29	29	31	35
68	**09-Aug-09**	**1179**	**0**	**28**	**30**	**29**	**27**	**29**	**29**	**31**	**35**
69	10-Aug-09	1194	8.5	28	30	29	27	29	29	31	35
70	**11-Aug-09**	**1212**	**0.9**	**28**	**30**	**29**	**27**	**29**	**29**	**31**	**35**
71	12-Aug-09	1230	0	28	30	29	27	29	29	31	35
72	**13-Aug-09**	**1248**	**0**	**28**	**30**	**29**	**27**	**29**	**29**	**31**	**35**
73	14-Aug-09	1269	0	28	30	29	27	29	29	32	35
74	**15-Aug-09**	**1293**	**0**	**28**	**30**	**29**	**27**	**29**	**29**	**32**	**35**
75	16-Aug-09	1318	0	28	30	29	27	29	29	32	35
76	**17-Aug-09**	**1342**	**0**	**28**	**30**	**29**	**27**	**29**	**29**	**32**	**35**
77	18-Aug-09	1367	0	28	30	29	27	29	29	32	35

Table E. 15(cont'd) Comparison of Total Body Scores (TBS), Accumulated Degree Days (ADD), and Total Precipitation for the month of August in relation to Time Since Death (TSD).

Comparison of Total Body Scores, Accumulated Degree Days and Total Precipitation for August											
TSD		ADD	Rain	CONTROL PAIR		FRESH PAIR		ADVANCED DECOMP PAIR		SKELETONIZED PAIR	
(days)	Date	Score	(mm)	PIG #1 TBS	PIG #2 TBS	PIG #3 TBS	PIG #4 TBS	PIG #7 TBS	PIG #8 TBS	PIG #5 TBS	PIG #6 TBS
78	19-Aug-09	1391	0	28	30	29	27	29	29	32	35
79	20-Aug-09	1414	0	28	30	29	27	29	29	32	35
80	21-Aug-09	1437	0	28	30	29	27	29	29	32	35
81	22-Aug-09	1461	0.2	28	30	29	27	29	29	32	35
82	23-Aug-09	1481	56.5	-	-	-	-	-	-	-	-
83	24-Aug-09	1493	TRACE	28	30	29	27	29	29	32	35
84	25-Aug-09	1513	TRACE	28	30	29	27	29	29	32	35

APPENDIX C:

Raw Munsell Colour Reading Data

CRANIUM LEFT Lateral View	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
Occipital Bone	10 YR 4/ 2	7.5YR 3/ 2	10 YR 5/ 2	10 YR 7/ 3	7.5YR 5/ 2	7.5YR 3/ 3	5 YR 6/ 3	2.5Y 6/ 2
Occipital Bone	10 YR 4/ 2	7.5YR 3/ 3	10 YR 4/ 3	7.5YR 6/ 2	7.5YR 6/ 2	10 YR 2/ 2	7.5YR 7/ 3	7.5YR 7/ 2
Occipital Bone	7.5YR 4/ 3	7.5YR 2/ 3	10 YR 5/ 2	7.5YR 4/ 3	2.5Y 6/ 1	7.5YR 2/ 2	10 YR 5/ 2	10 YR 6/ 2
Occipital Bone	10 YR 3/ 2	7.5YR 5/ 3	5 YR 5/ 2	10 YR 3/ 3	10 YR 4/ 2	7.5YR 2/ 3	7.5YR 5/ 3	10 YR 3/ 3
Occipital Bone	7.5YR 4/ 3	10 YR 3/ 3	7.5YR 3/ 2	N/A	10 YR 3/ 3	10 YR 6/ 2	10 YR 3/ 3	10 YR 4/ 2
Occipital condyle	10 YR 4/ 2	10 YR 3/ 2	7.5YR 7/ 3	10 YR 6/ 3	10 YR 4/ 2	N 1.5	10 YR 5/ 3	7.5YR 5/ 4
Occipital condyle	10 YR 5/ 2	10 YR 5/ 2	7.5YR 5/ 3	N/A	10 YR 6/ 3	7.5YR 3/ 3	10 YR 5/ 3	5 YR 6/ 2
nuchal crest	7.5YR 4/ 3	2.5Y 5/ 2	7.5YR 2/ 2	2.5Y 3/ 2	10 YR 4/ 2	10 YR 5/ 3	7.5YR 4/ 2	7.5YR 4/ 1
nuchal crest	7.5YR 4/ 3	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 3/ 2	10 YR 5/ 3	10 YR 4/ 2	10 YR 6/ 2
nuchal crest	2.5Y 2/ 2	2.5Y 5/ 4	10 YR 4/ 2	10 YR 5/ 3	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 5/ 2	10 YR 6/ 3
paramastoid process	7.5YR 3/ 3	10 YR 4/ 2	2.5Y 6/ 2	N/A	10 YR 4/ 2	10 YR 4/ 2	7.5YR 4/ 4	7.5YR 5/ 3
paramastoid process	7.5YR 4/ 3	10 YR 5/ 2	10 YR 5/ 2	10 YR 7/ 3	N/A	7.5YR 3/ 2	7.5YR 5/ 3	7.5YR 5/ 1
zygomatic process of temporal bone	10 YR 5/ 4	10 YR 5/ 3	10 YR 4/ 4	5 YR 3/ 2	10 YR 4/ 2	10 YR 5/ 2	10 YR 3/ 2	N 4.0
zygomatic process of temporal bone	10 YR 6/ 4	7.5YR 3/ 3	10 YR 5/ 4	5 YR 3/ 4	10 YR 4/ 2	10 YR 5/ 2	10 YR 3/ 2	2.5Y 2/ 1
zygomatic process of temporal bone	7.5YR 4/ 3	10 YR 3/ 3	7.5YR 4/ 4	10 YR 5/ 3	10 YR 3/ 2	7.5YR 4/ 3	10 YR 3/ 2	10 YR 3/ 1
external acoustic meatus	7.5YR 3/ 2	10 YR 4/ 3	5 Y 3/ 2	7.5YR 2/ 3	2.5Y 3/ 1	10 YR 2/ 1	10 YR 3/ 2	N 1.0
parietal bone	7.5YR 4/ 3	10 YR 3/ 2	10 YR 4/ 3	10 YR 6/ 3	10 YR 4/ 2	10 YR 3/ 3	10 YR 5/ 3	10 YR 5/ 2
parietal bone	7.5YR 5/ 3	10 YR 4/ 3	10 YR 2/ 1	2.5Y 5/ 2	7.5YR 4/ 3	7.5YR 4/ 3	7.5YR 5/ 4	7.5YR 2/ 2
parietal bone	10 YR 3/ 3	10 YR 3/ 3	7.5YR 4/ 3	2.5Y 4/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 5/ 3	5 YR 5/ 2
parietal crest	10 YR 3/ 3	10 YR 2/ 2	10 YR 4/ 3	10 YR 4/ 2	7.5YR 2/ 2	7.5YR 3/ 2	7.5YR 2/ 3	2.5Y 4/ 1
parietal crest	10 YR 3/ 3	10 YR 4/ 3	10 YR 3/ 2	2.5Y 5/ 2	7.5YR 3/ 2	10 YR 4/ 2	7.5YR 4/ 3	10 YR 4/ 2
parietal crest	10 YR 4/ 3	10 YR 5/ 4	2.5Y 4/ 2	10 YR 4/ 2	7.5YR 3/ 2	10 YR 4/ 2	10 YR 5/ 2	7.5YR 5/ 1
supraorbital process	10 YR 5/ 3	10 YR 4/ 4	10 YR 6/ 3	7.5YR 4/ 3	7.5YR 3/ 2	7.5YR 3/ 2	7.5YR 4/ 3	N 1.5
supraorbital foramen and groove	10 YR 5/ 2	7.5YR 2/ 2	10 YR 3/ 2	2.5Y 5/ 3	N/A	10 YR 2/ 2	10 YR 4/ 3	10 YR 3/ 1
infraorbital foramen	2.5Y 3/ 2	2.5Y 3/ 2	2.5Y 4/ 2	10 YR 2/ 2	10 YR 3/ 2	7.5Y 4/ 1	7.5YR 5/ 2	10 YR 3/ 2

CRANIUM (cont'd) LEFT Lateral View	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
frontal bone	7.5YR 5/ 3	7.5YR 3/ 2	10 YR 4/ 2	10 YR 6/ 3	10 YR 4/ 3	7.5YR 3/ 2	10 YR 5/ 4	7.5R 5/ 3
frontal bone	10 YR 6/ 2	10 YR 2/ 1	10 YR 3/ 2	10 YR 5/ 3	10 YR 4/ 2	10 YR 3/ 2	10 YR 5/ 3	N 2.0
frontal bone	10 YR 5/ 2	7.5YR 3/ 2	7.5YR 2/ 2	10 YR 2/ 2	7.5YR 3/ 2	7.5YR 2/ 2	10 YR 4/ 2	2.5Y 3/ 1
lacrimal bone	7.5YR 4/ 3	10 YR 3/ 3	10 YR 2/ 2	10 YR 2/ 2	10 YR 3/ 2	10 YR 2/ 2	7.5YR 2/ 2	N 1.5
malar bone	10 YR 6/ 3	7.5YR 5/ 3	7.5YR 5/ 4	7.5YR 4/ 4	7.5YR 5/ 2	10 YR 4/ 2	5 YR 5/ 2	10 YR 3/ 1
malar bone	7.5YR 6/ 3	5 YR 3/ 4	7.5YR 4/ 3	5 Y 6/ 2	2.5Y 5/ 1	10 YR 4/ 2	7.5YR 5/ 2	N 2.0
zygomatic process of malar bone	7.5YR 6/ 4	7.5YR 6/ 2	7.5YR 5/ 4	10 YR 5/ 4	7.5YR 5/ 2	10 YR 5/ 2	7.5YR 6/ 2	N 2.0
zygomatic process of malar bone	7.5YR 6/ 4	10 YR 6/ 2	10 YR 6/ 4	7.5YR 5/ 4	2.5Y 5/ 1	10 YR 4/ 2	10 YR 4/ 2	N 2.5
zygomatic process of malar bone	2.5Y 4/ 3	10 YR 6/ 2	10 YR 6/ 4	10 YR 5/ 3	2.5Y 4/ 1	7.5YR 5/ 2	10 YR 5/ 2	N 3.5
maxilla	2.5Y 3/ 2	10 YR 5/ 2	N 1.0	7.5YR 2/ 2	2.5Y 4/ 1	2.5Y 5/ 1	10 YR 4/ 2	10 YR 5/ 3
maxilla	10 YR 6/ 2	10 YR 4/ 1	10 YR 6/ 2	7.5YR 2/ 2	10 YR 5/ 2	7.5Y 2/ 2	7.5YR 3/ 2	
maxilla	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	7.5YR 3/ 2	2.5Y 5/ 1	10 YR 5/ 2	10 YR 5/ 2	
maxilla	10 YR 5/ 2	10 YR 4/ 2	2.5Y 5/ 2	10 YR 3/ 2	7.5YR 4/ 2	10 YR 3/ 2	10 YR 4/ 2	
maxilla	2.5Y 3/ 2	10 YR 5/ 2	10 YR 3/ 2	7.5YR 4/ 4	5 Y 3/ 1	N 1.5	7.5YR 4/ 2	
premaxilla	N/A	10 YR 5/ 2	10 YR 5/ 3	5 YR 3/ 3	10 YR 5/ 2	7.5GY 2/ 1	7.5YR 5/ 2	
premaxilla	N/A	10 YR 5/ 2	7.5YR 4/ 4	10 YR 5/ 4	7.5YR 6/ 2	2.5Y 4/ 2	7.5YR 4/ 2	
palatine bone	2.5Y 3/ 2	2.5Y 4/ 2	7.5YR 2/ 2	2.5Y 5/ 1	10 YR 3/ 2	10 YR 2/ 2	10 YR 3/ 2	
palatine bone	2.5Y 4/ 2	2.5Y 4/ 2	2.5Y 3/ 2	10 YR 4/ 2	2.5Y 4/ 1	7.5YR 2/ 3	10 YR 4/ 2	
palatine bone	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	7.5YR 5/ 3	10 YR 5/ 1	7.5YR 2/ 2	10 YR 4/ 3	
nasal bone	10 YR 5/ 2	5 YR 2/ 2	7.5YR 2/ 2	7.5YR 4/ 3	10 YR 3/ 2	7.5YR 3/ 2	10 YR 4/ 2	
nasal bone	10 YR 4/ 2	7.5YR 3/ 3	5 YR 2/ 2	5 YR 2/ 2	7.5YR 4/ 3	7.5YR 3/ 2	5 YR 4/ 2	
nasal bone	7.5YR 5/ 3	10 YR 4/ 2	7.5YR 4/ 3	2.5GY 4/ 3	7.5YR 3/ 2	7.5YR 3/ 3	10 YR 5/ 2	
nasal bone	10 YR 4/ 2	7.5YR 5/ 3	7.5YR 4/ 3	7.5YR 4/ 3	7.5YR 3/ 3	7.5YR 2/ 1	2.5Y 7/ 2	
condyle of mandible	10 YR 4/ 2	10 YR 5/ 3	10 YR 4/ 3	7.5YR 4/ 3	10 YR 5/ 2	N/A	7.5YR 5/ 4	
mental prominence	10 YR 4/ 3	10 YR 4/ 3	10 YR 5/ 2	2.5Y 5/ 1	10 YR 4/ 2	10 YR 4/ 3	7.5YR 5/ 3	10 YR 5/ 2

CRANIUM (cont'd) LEFT Lateral View	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
angle of mandible	10 YR 3/ 3	7.5YR 4/ 4	7.5YR 2/ 3	7.5R 2/ 2	10 YR 4/ 1	10 YR 5/ 2	10 YR 5/ 2	N 2.5
angle of mandible	10 YR 5/ 3	10 YR 3/ 4	7.5YR 4/ 3	7.5YR 5/ 4	2.5Y 5/ 1	10 YR 6/ 2	7.5YR 6/ 2	10 YR 2/ 1
angle of mandible	2.5Y 4/ 3	10 YR 4/ 3	10 YR 3/ 4	7.5YR 5/ 3	10 Y 3/ 1	10 YR 5/ 2	5 YR 6/ 2	N 1.0
horizontal part of ramus	10 YR 4/ 2	10 YR 5/ 2	7.5YR 3/ 2	7.5YR 4/ 4	10 YR 3/ 2	10 YR 5/ 1	10 YR 5/ 2	7.5YR 4/ 1
horizontal part of ramus	10 YR 2/ 2	7.5YR 4/ 4	7.5YR 4/ 4	10 YR 5/ 3	10 YR 3/ 2	10 YR 4/ 2	2.5Y 7/ 2	10 YR 5/ 2
horizontal part of ramus	10 YR 4/ 2	10 YR 7/ 3	5 YR 3/ 3	7.5YR 6/ 3	7.5YR 3/ 3	10 YR 4/ 2	10 YR 7/ 2	10 YR 2/ 1
horizontal part of ramus	10 YR 4/ 3	7.5YR 4/ 4	7.5YR 3/ 3	7.5YR 6/ 3	10 YR 2/ 1	10 YR 4/ 2	7.5YR 6/ 2	2.5Y 2/ 1
vertical part of ramus	7.5YR 4/ 3	10 YR 3/ 4	10 YR 3/ 3	5 YR 4/ 3	2.5Y 5/ 1	10 YR 4/ 2	5 YR 6/ 2	N 1.5
vertical part of ramus	10 YR 2/ 2	10 YR 3/ 3	7.5YR 4/ 3	10 YR 3/ 2	5 Y 5/ 1	10 YR 5/ 1	7.5YR 4/ 3	N 3.0
vertical part of ramus	10 YR 2/ 2	10 YR 3/ 3	7.5YR 4/ 3	10 YR 5/ 3	2.5Y 4/ 2	10 YR 5/ 2	2.5Y 5/ 2	N 3.0
vertical part of ramus	10 YR 3/ 3	10 YR 3/ 3	7.5YR 4/ 3	7.5YR 5/ 4	10 YR 3/ 2	5 Y 5/ 1	10 YR 6/ 1	N 2.0
coronoid process	10 YR 2/ 2	10 YR 5/ 3	7.5YR 3/ 2	10 YR 5/ 2	10 YR 4/ 2	2.5Y 5/ 2	7.5YR 4/ 4	N 7.5
coronoid process	7.5YR 3/ 3	2.5Y 3/ 2	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 5/ 4	7.5YR 3/ 2	10 YR 3/ 2	10 YR 7/ 1
CRANIUM RIGHT Lateral View								
zygomatic process of temporal bone	10 YR 7/ 3	10 YR 2/ 2	10 YR 2/ 2	7.5YR 5/ 3	10 YR 6/ 2	7.5YR 2/ 2	10 YR 5/ 2	10 YR 5/ 2
zygomatic process of temporal bone	10 YR 7/ 3	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 6/ 3	7.5YR 2/ 2	10 YR 6/ 2	10 YR 6/ 2
zygomatic process of temporal bone	10 YR 6/ 3	10 YR 6/ 3	7.5YR 5/ 3	10 YR 4/ 2	10 YR 6/ 3	7.5YR 2/ 3	10 YR 6/ 2	10 YR 6/ 2
external acoustic meatus	7.5YR 2/ 3	10 YR 3/ 2	10 YR 2/ 2	10 YR 4/ 2	10 YR 3/ 3	10 YR 2/ 2	10 YR 2/ 2	7.5YR 4/ 3
parietal bone	10 YR 4/ 3	7.5YR 3/ 2	7.5YR 4/ 2	10 YR 5/ 4	7.5YR 4/ 3	10 YR 3/ 3	10 YR 4/ 2	10 YR 5/ 3
parietal bone	10 YR 4/ 3	5 YR 2/ 2	10 YR 3/ 2	10 YR 5/ 3	7.5YR 4/ 2	10 YR 4/ 2	7.5YR 4/ 4	10 YR 4/ 3
parietal bone	2.5Y 2/ 2	7.5YR 2/ 2	10 YR 3/ 2	5 Y 5/ 2	7.5YR 3/ 2	7.5YR 3/ 2	10 YR 3/ 2	2.5Y 3/ 3
parietal crest	7.5YR 2/ 3	10 YR 5/ 3	10 YR 3/ 2	10 YR 6/ 3	7.5YR 2/ 2	10 YR 2/ 2	10 YR 3/ 3	10 YR 4/ 3
parietal crest	7.5YR 2/ 3	7.5YR 2/ 3	7.5YR 3/ 1	10 YR 6/ 3	10 YR 4/ 2	7.5YR 3/ 2	10 YR 4/ 2	2.5Y 3/ 2
parietal crest	7.5YR 3/ 3	7.5YR 2/ 3	7.5YR 2/ 2	10 YR 6/ 3	10 YR 4/ 2	7.5YR 3/ 3	7.5YR 3/ 2	10 YR 4/ 3
supraorbital process	10 YR 2/ 2	7.5YR 3/ 3	7.5YR 2/ 2	7.5YR 2/ 2	10 YR 3/ 2	7.5YR 4/ 3	10 YR 4/ 2	2.5Y 6/ 2

CRANIUM (cont'd) RIGHT Lateral View	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
supraorbital foramen and groove	7.5YR 4/ 2	7.5YR 2/ 1	7.5YR 2/ 2	7.5YR 4/ 3	5 YR 2/ 2	10 YR 2/ 2	10 YR 4/ 2	N/A
infraorbital foramen	10 YR 3/ 2	2.5Y 3/ 1	7.5YR 2/ 2	2.5Y 3/ 2	10 YR 2/ 2	2.5Y 2/ 2	7.5YR 4/ 2	5 Y 2/ 2
frontal bone	5 YR 3/ 2	10 YR 3/ 2	5 YR 2/ 2	7.5YR 4/ 3	7.5YR 3/ 2	10 YR 3/ 2	10 YR 5/ 4	10 YR 4/ 2
frontal bone	10 YR 4/ 2	7.5YR 3/ 1	10 YR 3/ 2	10 YR 4/ 3	10 YR 5/ 2	7.5YR 3/ 2	10 YR 5/ 3	5 Y 6/ 1
frontal bone	7.5YR 5/ 2	5 YR 2/ 2	7.5YR 2/ 2	7.5YR 3/ 2	7.5YR 3/ 2	10 YR 3/ 2	7.5YR 3/ 3	7.5YR 5/ 3
lacrimal bone	2.5Y 4/ 2	2.5YR 2/ 2	7.5YR 2/ 2	7.5YR 4/ 2	10 YR 4/ 2	7.5YR 2/ 3	7.5YR 3/ 2	10 YR 3/ 2
malar bone	10 YR 6/ 2	5 YR 3/ 3	7.5YR 4/ 3	10 YR 6/ 2	————	7.5YR 3/ 1	10 YR 7/ 3	10 YR 6/ 2
malar bone	10 YR 5/ 2	5 YR 4/ 4	7.5YR 4/ 3	10 YR 7/ 2	7.5YR 6/ 2	7.5YR 3/ 2	7.5YR 7/ 3	10 YR 6/ 3
zygomatic process of malar bone	7.5YR 4/ 3	10 YR 6/ 3	10 YR 6/ 3	7.5YR 7/ 2	2.5Y 7/ 2	5 YR 2/ 2	7.5YR 4/ 3	10 YR 6/ 2
zygomatic process of malar bone	10 YR 4/ 2	10 YR 6/ 3	7.5YR 5/ 3	10 YR 6/ 2	7.5YR 4/ 3	7.5YR 2/ 2	10 YR 6/ 3	10 YR 7/ 2
zygomatic process of malar bone	10 YR 4/ 2	10 YR 6/ 3	10 YR 5/ 3	10 YR 5/ 2	7.5YR 5/ 3	10 YR 2/ 1	N 1.0	7.5YR 6/ 2
maxilla	10 YR 5/ 2	5 YR 2/ 1	10 YR 3/ 2	7.5YR 4/ 2	5 YR 3/ 2	7.5YR 2/ 1	10 YR 4/ 2	7.5YR 2/ 3
maxilla	10 YR 2/ 1	10 Y 3/ 2	7.5YR 2/ 2	7.5YR 5/ 2	7.5YR 2/ 2	7.5YR 2/ 2	10 YR 4/ 2	7.5YR 3/ 2
maxilla	10 YR 3/ 2	2.5Y 3/ 1	5 Y 5/ 1	2.5Y 5/ 1	5 YR 2/ 2	10 YR 2/ 2	2.5Y 5/ 2	7.5YR 3/ 2
maxilla	7.5YR 3/ 2	N 1.0	10 YR 3/ 2	10 YR 5/ 2	7.5YR 3/ 3	10 YR 3/ 4	10 YR 4/ 2	10 YR 3/ 2
maxilla	5 YR 3/ 2	7.5YR 2/ 1	10 YR 4/ 2	5 YR 4/ 2	7.5YR 2/ 3	2.5Y 3/ 2	10 YR 4/ 2	7.5YR 4/ 2
premaxilla	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 4/ 2	10 YR 5/ 3	7.5YR 3/ 3	7.5YR 3/ 3	7.5YR 5/ 3	7.5YR 5/ 2
premaxilla	7.5YR 3/ 3	5 YR 2/ 2	7.5YR 3/ 2	10 YR 6/ 3	7.5YR 3/ 2	10 YR 3/ 4	7.5YR 5/ 3	10 YR 5/ 3
premaxilla	7.5YR 3/ 3	10 YR 2/ 1	7.5YR 3/ 2	10 YR 7/ 2	7.5YR 3/ 2	7.5YR 4/ 4	7.5YR 4/ 4	10 YR 4/ 2
palatine bone	2.5Y 2/ 2	7.5Y 3/ 2	10 YR 3/ 2	10 YR 4/ 2	10 YR 4/ 2	2.5Y 2/ 2	2.5Y 3/ 2	5 Y 2/ 2
palatine bone	2.5Y 2/ 2	2.5Y 3/ 2	2.5Y 2/ 1	10 YR 4/ 2	2.5Y 4/ 2	2.5Y 3/ 3	2.5Y 3/ 2	5 Y 2/ 2
palatine bone	5 Y 3/ 2	10 YR 4/ 3	7.5YR 3/ 2	10 YR 3/ 2	10 YR 6/ 3	7.5YR 5/ 4	10 YR 4/ 2	10 YR 4/ 2
nasal bone	7.5YR 4/ 2	5 YR 2/ 2	10 YR 3/ 2	7.5YR 3/ 2	7.5YR 3/ 2	7.5YR 3/ 2	10 YR 5/ 2	10 YR 4/ 2
nasal bone	10 YR 4/ 2	7.5YR 4/ 3	10 YR 3/ 2	7.5YR 3/ 1	7.5YR 3/ 3	7.5YR 3/ 2	2.5Y 5/ 2	7.5YR 5/ 3
nasal bone	7.5YR 4/ 2	7.5YR 4/ 3	7.5YR 3/ 3	5 YR 2/ 2	7.5YR 3/ 2	7.5YR 3/ 2	10 YR 6/ 2	10 YR 4/ 2

CRANIUM (cont'd) RIGHT Lateral View	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
nasal bone	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 3/ 2	10 YR 4/ 2	7.5YR 3/ 2	10 YR 3/ 2	7.5YR 7/ 3	7.5YR 5/ 2
condyle of mandible	10 YR 6/ 3	10 YR 5/ 4	10 YR 5/ 3	10 YR 5/ 3	7.5YR 5/ 1	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 6/ 3
angle of mandible	10 YR 4/ 2	10 YR 5/ 3	7.5YR 3/ 2	10 YR 6/ 2	10 YR 3/ 2	7.5YR 2/ 3	7.5YR 4/ 3	10 YR 4/ 2
angle of mandible	10 YR 5/ 2	10 YR 5/ 2	7.5YR 3/ 2	10 YR 6/ 2	10 YR 3/ 2	7.5YR 3/ 3	10 YR 5/ 2	10 YR 7/ 3
angle of mandible	10 YR 6/ 3	10 YR 5/ 3	7.5YR 4/ 3	10 YR 5/ 2	10 YR 4/ 2	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 7/ 2
body of mandible (dorsal view)	7.5Y 2/ 2	5 Y 2/ 2	7.5YR 3/ 3	7.5YR 4/ 3	N/A	N/A	N/A	N/A
body of mandible (dorsal view)	10 YR 3/ 3	N 1.0	7.5YR 3/ 2	7.5YR 3/ 3	N/A	N/A	N/A	N/A
body of mandible (dorsal view)	10 YR 2/ 2	7.5YR 2/ 3	10 YR 2/ 2	10 YR 3/ 2	N/A	N/A	N/A	N/A
horizontal part of ramus	7.5YR 5/ 3	10 YR 3/ 3	10 YR 2/ 1	7.5YR 5/ 3	10 YR 5/ 2	7.5YR 3/ 3	10 YR 3/ 3	7.5YR 5/ 3
horizontal part of ramus	7.5YR 3/ 2	10 YR 3/ 4	7.5YR 3/ 1	7.5YR 5/ 2	7.5YR 4/ 3	7.5YR 3/ 3	7.5YR 4/ 3	2.5Y 5/ 2
horizontal part of ramus	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 3/ 2	7.5YR 7/ 1	10 YR 4/ 2	7.5YR 2/ 3	7.5YR 5/ 3	7.5YR 6/ 1
horizontal part of ramus	10 YR 6/ 2	10 YR 3/ 3	5 YR 2/ 2	10 YR 6/ 2	10 YR 5/ 2	7.5YR 2/ 3	7.5YR 5/ 3	7.5YR 7/ 2
vertical part of ramus	10 YR 5/ 2	10 YR 4/ 3	7.5YR 3/ 2	10 YR 6/ 2	10 YR 4/ 2	7.5YR 2/ 2	7.5YR 5/ 3	2.5Y 7/ 1
vertical part of ramus	7.5YR 5/ 2	7.5YR 2/ 3	7.5YR 3/ 2	7.5YR 6/ 2	7.5YR 4/ 2	10 YR 3/ 4	10 YR 4/ 2	7.5YR 5/ 2
vertical part of ramus	10 YR 5/ 2	7.5YR 2/ 3	7.5YR 3/ 2	2.5Y 7/ 1	10 YR 3/ 2	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 7/ 2
vertical part of ramus	7.5YR 5/ 2	10 YR 5/ 3	7.5YR 3/ 3	7.5YR 6/ 2	10 YR 4/ 2	5 YR 2/ 2	7.5YR 5/ 3	5 YR 6/ 1
coronoid process	10 YR 6/ 2	7.5YR 4/ 4	5 YR 2/ 2	7.5YR 5/ 3	10 YR 4/ 2	7.5YR 3/ 4	7.5YR 4/ 3	10 YR 3/ 4
coronoid process	7.5YR 4/ 2	10 YR 4/ 2	7.5YR 3/ 1	10 YR 5/ 3	10 YR 2/ 2	10 YR 3/ 3	5 Y 3/ 1	5 Y 4/ 2
LEFT SCAPULA Lateral View								
SL spine	10 YR 2/ 2	10 YR 3/ 3	10 YR 3/ 3	10 YR 4/ 2	10 YR 5/ 1	10 YR 3/ 1	10 YR 3/ 2	2.5Y 5/ 2
SL spine	7.5YR 2/ 3	10 YR 4/ 3	10 YR 4/ 3	10 YR 4/ 2	10 YR 7/ 2	N 1.5	10 YR 4/ 2	2.5Y 5/ 2
SL tuber spinae	7.5YR 5/ 4	10 YR 5/ 4	10 YR 7/ 4	10 YR 4/ 2	10 YR 5/ 4	2.5Y 2/ 1	10 YR 6/ 2	7.5YR 5/ 4
SL acromion	2.5Y 4/ 2	10 YR 5/ 3	10 YR 4/ 2	7.5YR 5/ 3	10 YR 6/ 3	7.5YR 4/ 2	7.5YR 7/ 3	2.5Y 6/ 1
SL supraspinous fossa	7.5YR 3/ 2	10 YR 3/ 2	10 YR 4/ 2	10 YR 4/ 3	5 YR 4/ 2	N 1.5	10 YR 4/ 2	10 YR 5/ 3
SL supraspinous fossa	10 YR 4/ 2	2.5Y 3/ 3	10 YR 3/ 2	10 YR 3/ 3	2.5Y 3/ 2	N 1.0	10 YR 2/ 1	10 YR 3/ 2

LEFT SCAPULA Lateral View	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
SL supraspinous fossa	10 YR 2/ 2	10 YR 5/ 3	10 YR 4/ 2	10 YR 2/ 2	7.5Y 4/ 1	N 1.5	10 YR 5/ 2	10 YR 4/ 2
SL infraspinous fossa	10 YR 2/ 2	2.5Y 2/ 1	10 Y 3/ 1	2.5Y 3/ 2	5 Y 4/ 2	N 1.0	5 Y 3/ 1	10 YR 3/ 2
SL infraspinous fossa	N 1.0	2.5Y 2/ 2	5 Y 2/ 2	10 YR 2/ 2	2.5Y 6/ 4	N 1.5	7.5Y 3/ 2	10 YR 4/ 3
SL infraspinous fossa	N 1.0	10 YR 4/ 3	7.5Y 4/ 1	7.5YR 4/ 2	2.5Y 2/ 2	N 2.0	10 YR 4/ 2	2.5Y 3/ 2
SL infraspinous fossa	10 YR 2/ 2	5 Y 3/ 1	2.5Y 6/ 1	10 YR 5/ 2	7.5Y 4/ 2	N 1.0	5 Y 5/ 1	7.5Y 3/ 2
SL neck	10 YR 3/ 2	10 YR 5/ 3	7.5YR 6/ 2	7.5YR 4/ 2	10 YR 6/ 6	10 YR 4/ 2	5 YR 6/ 2	5 Y 7/ 2
SL neck	2.5Y 3/ 2	10 YR 5/ 3	7.5YR 6/ 2	10 YR 4/ 2	10 YR 6/ 6	10 YR 3/ 2	10 YR 6/ 2	2.5Y 6/ 2
SL tuber scapulae	10 YR 4/ 2	2.5Y 5/ 3	N/A	7.5YR 3/ 2	10 YR 6/ 2	2.5Y 2/ 1	10 YR 5/ 3	10 YR 6/ 3
SL glenoid cavity	7.5YR 3/ 3	7.5YR 4/ 3	N/A	7.5YR 3/ 2	7.5YR 4/ 3	10 YR 4/ 2	10 YR 4/ 3	7.5YR 3/ 2
SL glenoid cavity	7.5YR 2/ 3	2.5Y 3/ 2	7.5YR 5/ 3	7.5YR 2/ 3	10 YR 5/ 2	7.5YR 4/ 2	10 YR 4/ 3	7.5YR 5/ 3
SL anterior border	10 YR 4/ 2	7.5YR 5/ 2	10 YR 6/ 3	10 YR 4/ 2	10 YR 5/ 2	N 1.5	10 YR 6/ 2	10 YR 6/ 4
SL anterior border	7.5YR 6/ 3	10 YR 4/ 3	7.5YR 4/ 4	7.5YR 5/ 3	7.5YR 5/ 3	N 1.5	10 YR 5/ 2	10 YR 7/ 3
SL anterior border	10 YR 6/ 2	10 YR 3/ 3	7.5YR 4/ 3	5 Y 6/ 1	10 YR 5/ 2	2.5Y 3/ 1	7.5YR 4/ 3	7.5YR 7/ 3
SL anterior angle	10 YR 6/ 2	10 YR 6/ 4	10 YR 5/ 2	10 YR 6/ 3	10 YR 6/ 2	N/A	7.5YR 6/ 3	7.5YR 4/ 4
SL posterior border	7.5YR 4/ 3	2.5Y 4/ 3	10 YR 5/ 2	7.5YR 3/ 3	10 YR 7/ 2	N 2.0	7.5YR 5/ 3	10 YR 6/ 3
SL posterior border	10 YR 4/ 2	10 YR 5/ 4	7.5YR 7/ 3	7.5YR 5/ 3	10 YR 6/ 3	2.5Y 2/ 1	7.5YR 6/ 3	7.5YR 7/ 3
SL posterior border	7.5YR 4/ 3	10 YR 6/ 3	2.5Y 7/ 3	7.5YR 6/ 2	7.5YR 7/ 3	N 2.5	7.5YR 7/ 3	10 YR 5/ 2
SL posterior angle	2.5YR 2/ 2	10 YR 5/ 3	10 YR 6/ 3	7.5YR 6/ 3	10 YR 7/ 4	10 YR 3/ 1	7.5YR 4/ 3	10 YR 6/ 2
LEFT SCAPULA Medial View								
SL subscapular fossa	7.5YR 5/ 3	10 YR 4/ 3	10 YR 6/ 3	10 YR 5/ 3	10 YR 5/ 2	N 2.5	2.5Y 4/ 2	5 YR 5/ 2
SL subscapular fossa	10 YR 5/ 3	10 YR 4/ 3	10 YR 6/ 3	7.5YR 3/ 3	7.5YR 6/ 2	N 2.5	7.5YR 4/ 2	7.5YR 5/ 3
SL subscapular fossa	10 YR 5/ 2	7.5YR 3/ 2	2.5Y 5/ 2	7.5YR 4/ 3	7.5YR 5/ 2	N 3.0	7.5YR 4/ 3	5 YR 6/ 2
SL subscapular fossa	10 YR 6/ 3	10 YR 3/ 3	10 YR 4/ 2	7.5YR 4/ 3	10 YR 5/ 2	10 YR 2/ 1	7.5YR 3/ 2	7.5YR 6/ 2
SL subscapular fossa	10 YR 6/ 2	7.5YR 4/ 4	7.5YR 4/ 3	2.5Y 4/ 2	10 YR 5/ 2	10 YR 2/ 1	7.5YR 4/ 2	5 YR 6/ 2
SL serratus area	10 YR 6/ 3	10 YR 5/ 3	7.5YR 5/ 2	10 YR 5/ 3	10 YR 7/ 1	10 YR 3/ 1	7.5YR 4/ 3	10 YR 6/ 2

LEFT SCAPULA Medial View	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
SL serratus area	7.5YR 5/ 4	7.5YR 5/ 3	10 YR 5/ 2	5 YR 4/ 3	10 YR 7/ 1	N 3.0	10 YR 6/ 2	10 YR 7/ 1
SL serratus area	10 YR 5/ 3	7.5YR 3/ 3	7.5YR 3/ 3	7.5YR 5/ 3	2.5Y 6/ 1	N 2.5	10 YR 5/ 2	7.5YR 5/ 2
SL neck	10 YR 5/ 3	10 YR 2/ 2	10 YR 5/ 2	7.5YR 4/ 4	10 YR 5/ 2	7.5YR 3/ 3	5 YR 4/ 3	10 YR 5/ 2
SL neck	7.5YR 5/ 3	2.5Y 2/ 2	10 YR 6/ 2	7.5YR 3/ 3	7.5YR 6/ 2	10 YR 2/ 2	7.5YR 4/ 3	10 YR 5/ 2
RIGHT SCAPULA Lateral View								
SR spine	10 YR 2/ 2	2.5Y 3/ 2	2.5Y 4/ 2	7.5YR 5/ 1	7.5YR 5/ 2	7.5YR 2/ 3	10 YR 4/ 2	10 YR 6/ 1
SR spine	10 YR 2/ 2	2.5Y 3/ 2	10 YR 3/ 2	7.5YR 6/ 1	10 YR 6/ 2	7.5YR 2/ 2	2.5Y 4/ 1	7.5YR 5/ 1
SR tuber spinae	10 YR 4/ 3	10 YR 7/ 2	7.5YR 7/ 2	7.5YR 7/ 2	10 YR 5/ 2	7.5YR 3/ 1	10 YR 7/ 2	2.5Y 6/ 2
SR acromion	10 YR 2/ 2	10 YR 2/ 2	10 YR 4/ 2	2.5Y 5/ 2	10 YR 4/ 2	7.5YR 2/ 3	10 YR 4/ 2	7.5YR 5/ 3
SR supraspinous fossa	10 YR 2/ 2	2.5Y 2/ 2	10 YR 3/ 2	10 YR 2/ 2	10 YR 3/ 2	7.5YR 2/ 3	7.5YR 2/ 3	10 YR 5/ 2
SR supraspinous fossa	N 1.0	10 YR 3/ 2	10 YR 2/ 2	2.5Y 2/ 2	2.5Y 2/ 2	7.5YR 2/ 3	2.5Y 2/ 1	7.5YR 4/ 2
SR supraspinous fossa	10 YR 6/ 2	10 YR 3/ 3	7.5YR 3/ 2	10 YR 2/ 1	7.5YR 2/ 3	7.5YR 2/ 3	2.5Y 3/ 2	7.5YR 4/ 2
SR infraspinous fossa	10 YR 2/ 2	2.5Y 2/ 2	7.5Y 4/ 1	2.5Y 2/ 2	5 Y 2/ 2	7.5YR 2/ 3	5 Y 2/ 2	2.5GY 2/ 2
SR infraspinous fossa	N 1.0	2.5Y 3/ 2	10 YR 3/ 2	10 YR 2/ 2	2.5Y 3/ 2	N 2.0	10 YR 2/ 2	10 YR 4/ 2
SR infraspinous fossa	10 YR 2/ 2	N 1.0	7.5YR 2/ 2	10 YR 2/ 2	10 YR 5/ 2	N 1.5	10 YR 2/ 2	2.5Y 3/ 1
SR infraspinous fossa	N 1.0	2.5Y 5/ 1	2.5Y 2/ 1	10 YR 3/ 2	10 YR 3/ 2	2.5Y 2/ 1	10 YR 4/ 2	2.5Y 2/ 1
SR neck	7.5YR 3/ 3	7.5YR 5/ 3	7.5YR 4/ 3	10 YR 4/ 3	7.5YR 4/ 3	10 YR 3/ 3	10 YR 4/ 2	10 YR 4/ 1
SR neck	10 YR 3/ 2	10 YR 3/ 3	10 YR 3/ 2	10 YR 4/ 2	7.5YR 4/ 3	N 1.0	10 YR 3/ 2	2.5Y 4/ 2
SR tuber scapulae	7.5YR 3/ 2	2.5Y 6/ 3	N/A	7.5YR 4/ 3	10 YR 5/ 3	N 1.5	7.5YR 4/ 4	7.5YR 6/ 3
SR glenoid cavity	2.5Y 3/ 3	10 YR 4/ 3	N/A	7.5YR 2/ 3	2.5Y 6/ 3	N 2.0	10 YR 3/ 3	10 YR 3/ 4
SR glenoid cavity	7.5YR 3/ 3	10 YR 3/ 3	7.5YR 2/ 3	10 YR 3/ 3	10 YR 6/ 3	7.5YR 4/ 4	7.5YR 3/ 4	10 YR 4/ 3
SR anterior border	10 YR 4/ 2	10 YR 6/ 3	10 YR 5/ 3	10 YR 5/ 3	10 YR 5/ 3	10 YR 3/ 3	10 YR 5/ 3	7.5YR 5/ 3
SR anterior border	10 YR 6/ 3	10 YR 5/ 3	10 YR 4/ 2	10 YR 6/ 3	10 Y 7/ 1	2.5Y 2/ 2	7.5YR 5/ 3	10 YR 6/ 3
SR anterior border	10 YR 6/ 2	7.5YR 5/ 4	10 YR 4/ 2	10 YR 6/ 2	2.5Y 7/ 2	N/A	7.5YR 5/ 3	10 YR 6/ 2
SR anterior angle	10 YR 6/ 2	5 YR 4/ 3	10 YR 4/ 2	10 YR 6/ 3	10 YR 6/ 2	N/A	7.5YR 6/ 4	7.5YR 6/ 3

RIGHT SCAPULA (cont'd) Lateral View	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
SR posterior border	10 YR 3/ 2	10 YR 2/ 2	7.5YR 4/ 2	10 YR 4/ 3	10 YR 6/ 2	5 Y 2/ 1	10 YR 5/ 3	2.5Y 4/ 3
SR posterior border	7.5YR 5/ 3	10 YR 4/ 3	10 YR 6/ 2	10 YR 6/ 3	7.5YR 7/ 3	N 2.0	10 YR 5/ 3	2.5Y 5/ 2
SR posterior border	7.5YR 4/ 3	10 YR 4/ 3	7.5YR 5/ 2	10 YR 5/ 2	7.5YR 6/ 3	N 2.0	5 YR 4/ 3	7.5YR 7/ 1
SR posterior angle	7.5YR 4/ 3	10 YR 5/ 3	10 YR 6/ 2	7.5YR 4/ 3	7.5YR 7/ 2	2.5Y 3/ 1	7.5YR 4/ 3	10 YR 5/ 2
RIGHT SCAPULA Medial View								
SR subscapular fossa	10 YR 4/ 2	10 YR 5/ 3	10 YR 4/ 2	7.5YR 4/ 3	10 YR 6/ 2	10 YR 6/ 2	7.5YR 3/ 3	10 YR 4/ 2
SR subscapular fossa	7.5YR 5/ 3	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 5/ 2	10 YR 6/ 3	7.5YR 6/ 2	7.5YR 3/ 2	10 YR 5/ 2
SR subscapular fossa	10 YR 5/ 3	7.5YR 2/ 2	10 YR 7/ 2	10 YR 5/ 3	7.5YR 5/ 2	7.5YR 7/ 2	10 YR 4/ 3	7.5YR 6/ 2
SR subscapular fossa	7.5YR 4/ 2	10 YR 5/ 2	7.5YR 4/ 2	10 YR 4/ 2	10 YR 4/ 3	N 2.0	10 YR 3/ 3	7.5YR 6/ 3
SR subscapular fossa	10 YR 2/ 2	10 YR 6/ 2	7.5YR 6/ 3	7.5YR 4/ 3	10 YR 4/ 2	7.5YR 7/ 2	2.5Y 4/ 3	7.5YR 5/ 3
SR serratus area	10 YR 4/ 3	7.5YR 5/ 4	10 YR 5/ 2	7.5YR 5/ 3	10 YR 6/ 3	N 2.5	7.5YR 5/ 3	10 YR 5/ 2
SR serratus area	2.5Y 3/ 3	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 5/ 2	7.5YR 5/ 4	N 1.5	10 YR 4/ 2	7.5YR 4/ 3
SR serratus area	10 YR 4/ 3	2.5Y 4/ 3	10 YR 3/ 2	7.5YR 5/ 4	7.5YR 3/ 2	5 YR 7/ 2	7.5YR 3/ 3	10 YR 4/ 2
SR neck	7.5YR 3/ 2	10 YR 6/ 3	10 YR 5/ 3	7.5YR 5/ 3	10 YR 6/ 2	2.5GY 2/ 1	10 YR 5/ 2	2.5Y 6/ 2
SR neck	7.5YR 3/ 2	10 YR 6/ 2	7.5YR 4/ 3	10 YR 4/ 2	10 YR 6/ 3	7.5YR 4/ 3	10 YR 4/ 2	10 YR 6/ 3
LEFT HUMERUS								
HL head epiphysis	5 YR 5/ 1	7.5YR 5/ 3	10 R 7/ 1	7.5YR 4/ 2	10 YR 5/ 4	10 YR 2/ 1	2.5Y 7/ 2	7.5YR 6/ 3
HL head epiphysis	7.5YR 6/ 2	2.5Y 7/ 2	7.5YR 7/ 2	7.5YR 6/ 2	10 YR 6/ 2	10 YR 4/ 3	10 YR 6/ 3	7.5YR 5/ 4
HL lateral epiphysis	10 YR 5/ 2	10 YR 6/ 3	2.5Y 7/ 2	10 YR 7/ 4	7.5YR 4/ 2	10 YR 3/ 1	10 YR 6/ 2	7.5YR 5/ 3
HL lateral epiphysis	7.5YR 6/ 2	10 YR 2/ 2	10 YR 6/ 2	10 YR 7/ 2	7.5YR 6/ 3	10 YR 5/ 2	10 YR 6/ 3	5 YR 5/ 3
HL deltoid tuberosity	7.5YR 6/ 4	10 YR 5/ 3	7.5YR 5/ 3	10 YR 6/ 4	10 YR 7/ 3	2.5Y 7/ 2	7.5YR 6/ 3	7.5YR 7/ 3
HL cranial aspect of metaphysis	10 YR 6/ 4	10 YR 6/ 2	10 YR 5/ 3	7.5YR 7/ 3	7.5YR 7/ 3	10 YR 5/ 3	7.5YR 6/ 4	10 YR 7/ 3
HL cranial aspect of metaphysis	7.5YR 7/ 3	10 YR 5/ 2	10 YR 5/ 2	7.5YR 7/ 3	7.5YR 7/ 3	7.5YR 7/ 3	7.5YR 7/ 3	10 YR 7/ 2
HL cranial aspect of metaphysis	7.5YR 5/ 3	10 YR 5/ 2	10 YR 6/ 2	10 YR 8/ 3	10 YR 7/ 4	10 YR 7/ 2	10 YR 6/ 2	10 YR 7/ 2
HL cranial aspect of metaphysis	2.5Y 4/ 2	10 YR 3/ 2	10 YR 4/ 2	7.5YR 5/ 2	7.5YR 5/ 3	7.5YR 5/ 3	10 YR 3/ 3	10 YR 4/ 2

LEFT HUMERUS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
HL lateral aspect of neck	7.5YR 3/ 3	2.5Y 2/ 2	10 YR 3/ 2	10 YR 3/ 3	10 YR 5/ 3	2.5Y 5/ 2	10 YR 5/ 4	7.5YR 6/ 3
HL lateral aspect of neck	7.5YR 3/ 2	7.5YR 2/ 3	10 YR 3/ 3	10 YR 3/ 3	10 YR 7/ 3	7.5YR 5/ 3	7.5YR 4/ 4	10 YR 4/ 3
HL lateral aspect of metaphysis	7.5YR 5/ 3	7.5YR 5/ 3	10 YR 6/ 2	10 YR 6/ 3	2.5Y 7/ 3	7.5YR 5/ 3	10 YR 6/ 2	5 YR 7/ 3
HL lateral aspect of metaphysis	7.5YR 6/ 2	10 YR 5/ 2	7.5YR 7/ 2	10 YR 7/ 2	10 YR 8/ 2	5 Y 7/ 1	10 YR 7/ 3	10 YR 7/ 2
HL lateral aspect of metaphysis	10 YR 5/ 1	10 YR 5/ 3	10 YR 7/ 2	2.5Y 7/ 2	10 YR 7/ 2	10 YR 6/ 2	10 YR 6/ 3	10 YR 6/ 2
HL lateral aspect of metaphysis	10 YR 4/ 2	10 YR 5/ 3	7.5YR 5/ 3	10 YR 6/ 3	5 Y 7/ 1	10 YR 6/ 2	10 YR 5/ 3	10 Y 7/ 1
HL caudal aspect of neck	2.5GY 4/ 1	7.5YR 2/ 3	10 YR 2/ 2	7.5YR 2/ 3	10 YR 4/ 2	10 YR 3/ 3	10 YR 3/ 3	10 YR 4/ 3
HL caudal aspect of neck	10 YR 3/ 2	10 YR 2/ 2	10 YR 3/ 3	7.5YR 2/ 3	10 YR 3/ 2	10 YR 4/ 2	7.5YR 4/ 4	10 YR 5/ 3
HL caudal aspect of metaphysis	2.5Y 3/ 2	10 YR 3/ 2	2.5Y 3/ 1	10 YR 3/ 3	7.5YR 3/ 2	2.5Y 4/ 1	2.5Y 3/ 2	7.5Y 4/ 1
HL caudal aspect of metaphysis	2.5Y 4/ 2	10 YR 4/ 2	10 YR 4/ 2	2.5Y 4/ 3	7.5YR 5/ 3	7.5YR 6/ 3	10 YR 3/ 2	10 YR 6/ 2
HL caudal aspect of metaphysis	10 YR 4/ 1	2.5Y 4/ 3	2.5Y 5/ 2	10 YR 6/ 3	7.5YR 5/ 3	7.5YR 7/ 3	10 YR 6/ 2	2.5Y 6/ 2
HL caudal aspect of metaphysis	10 YR 5/ 2	10 YR 5/ 3	7.5YR 5/ 2	7.5YR 6/ 2	7.5YR 5/ 3	7.5YR 7/ 3	10 YR 5/ 2	7.5YR 7/ 3
HL medial aspect of neck	10 YR 4/ 2	7.5YR 3/ 2	10 YR 3/ 3	7.5YR 3/ 3	10 YR 3/ 3	10 YR 3/ 3	7.5YR 4/ 3	10 YR 4/ 3
HL medial aspect of neck	10 YR 5/ 2	7.5YR 4/ 3	10 YR 4/ 3	7.5YR 5/ 3	10 YR 3/ 2	7.5YR 4/ 4	10 YR 6/ 2	10 YR 6/ 3
HL medial aspect of metaphysis	10 YR 6/ 2	10 YR 4/ 2	10 YR 4/ 2	5 YR 6/ 2	7.5YR 3/ 2	7.5YR 4/ 4	7.5YR 6/ 2	7.5YR 7/ 2
HL medial aspect of metaphysis	10 YR 5/ 2	10 YR 4/ 2	7.5YR 3/ 2	7.5YR 6/ 3	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 5/ 3	7.5YR 7/ 2
HL medial aspect of metaphysis	10 YR 5/ 3	7.5YR 5/ 3	10 YR 4/ 2	10 YR 5/ 3	10 YR 4/ 3	7.5YR 5/ 4	10 YR 6/ 2	7.5YR 7/ 1
HL medial aspect of metaphysis	7.5YR 4/ 3	10 YR 5/ 3	2.5Y 5/ 2	7.5YR 5/ 3	7.5YR 3/ 1	7.5YR 4/ 4	10 YR 5/ 3	10 YR 6/ 2
HL coronoid fossa	2.5Y 3/ 2	5 Y 3/ 2	5 Y 3/ 2	2.5Y 3/ 2	2.5Y 2/ 2	2.5Y 4/ 2	2.5Y 2/ 2	5 Y 3/ 1
HL medial epicondyle	7.5YR 4/ 3	7.5YR 5/ 3	10 YR 4/ 3	7.5YR 4/ 4	7.5YR 3/ 3	7.5YR 3/ 3	10 YR 5/ 3	10 YR 6/ 3
HL medial condyle	10 YR 5/ 3	10 YR 4/ 2	10 YR 4/ 2	10 YR 5/ 3	10 YR 5/ 4	7.5YR 2/ 2	10 YR 5/ 3	5 YR 5/ 3
HL lateral condyle	7.5YR 5/ 3	7.5YR 3/ 2	7.5YR 4/ 3	10 YR 5/ 3	10 YR 6/ 2	7.5YR 3/ 3	10 YR 5/ 3	7.5YR 4/ 3
HL lateral epicondyle	10 YR 4/ 3	10 YR 4/ 3	2.5Y 6/ 2	2.5Y 7/ 2	7.5YR 5/ 4	10 YR 6/ 2	10 YR 5/ 4	10 YR 6/ 4
HL lateral condyloid crest	10 YR 4/ 3	2.5Y 4/ 3	10 YR 5/ 2	7.5YR 6/ 4	7.5YR 7/ 2	10 YR 5/ 2	N 1.0	10 YR 8/ 3
HL olecranon fossa	N 1.0	2.5Y 2/ 1	7.5YR 2/ 1	2.5Y 2/ 2	2.5Y 2/ 2	10 YR 2/ 2	5 YR 2/ 3	2.5Y 5/ 2

RIGHT Humerus	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
HR head epiphysis	5 YR 5/ 1	7.5YR 6/ 2	7.5YR 4/ 3	7.5YR 5/ 2	5 YR 6/ 3	7.5YR 5/ 3	7.5YR 4/ 4	7.5YR 7/ 3
HR head epiphysis	10 YR 5/ 2	2.5Y 4/ 3	7.5YR 6/ 2	10 YR 4/ 3	5 Y 7/ 1	5 Y 3/ 1	7.5YR 4/ 4	10 YR 6/ 2
HR lateral epiphysis	5 Y 7/ 1	7.5YR 4/ 3	7.5Y 2/ 2	N/A	10 YR 7/ 2	10 YR 2/ 1	7.5YR 4/ 3	10 YR 6/ 2
HR lateral epiphysis	7.5YR 5/ 2	7.5YR 5/ 3	2.5Y 3/ 1	N/A	10 YR 4/ 2	7.5YR 3/ 2	10 YR 5/ 3	10 YR 6/ 3
HR deltoid tuberosity	10 YR 5/ 2	7.5YR 5/ 4	2.5Y 2/ 2	10 YR 6/ 3	7.5YR 6/ 2	10 YR 5/ 4	10 YR 4/ 3	7.5YR 5/ 3
HR cranial aspect of metaphysis	7.5YR 4/ 3	10 YR 4/ 2	7.5YR 5/ 3	2.5Y 6/ 1	7.5YR 6/ 4	10 YR 5/ 3	10 YR 6/ 3	5 YR 5/ 4
HR cranial aspect of metaphysis	7.5YR 5/ 3	10 YR 5/ 2	7.5YR 7/ 3	7.5YR 6/ 2	7.5YR 6/ 4	10 YR 8/ 2	2.5Y 6/ 3	10 YR 7/ 2
HR cranial aspect of metaphysis	10 YR 5/ 3	10 YR 5/ 2	7.5YR 6/ 2	7.5YR 8/ 2	10 YR 5/ 4	10 YR 7/ 2	10 YR 6/ 3	7.5YR 6/ 3
HR cranial aspect of metaphysis	7.5YR 5/ 2	7.5YR 3/ 3	10 YR 4/ 2	5 YR 5/ 2	10 YR 4/ 3	10 YR 5/ 3	10 YR 3/ 2	10 YR 3/ 2
HR lateral aspect of neck	7.5YR 3/ 3	10 YR 5/ 3	7.5YR 3/ 3	7.5YR 4/ 3	10 YR 5/ 2	7.5YR 2/ 3	7.5YR 4/ 3	7.5YR 2/ 3
HR lateral aspect of neck	10 YR 4/ 2	10 YR 6/ 3	10 YR 2/ 2	7.5YR 5/ 3	2.5Y 7/ 3	7.5YR 3/ 3	10 YR 4/ 3	7.5YR 3/ 3
HR lateral aspect of metaphysis	10 YR 4/ 2	10 YR 7/ 2	10 YR 3/ 1	10 YR 6/ 2	2.5Y 7/ 3	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 5/ 3
HR lateral aspect of metaphysis	7.5YR 5/ 2	10 YR 6/ 2	7.5YR 5/ 1	7.5YR 5/ 2	10 YR 6/ 4	10 YR 5/ 4	5 YR 5/ 2	2.5Y 6/ 1
HR lateral aspect of metaphysis	7.5YR 5/ 2	10 YR 6/ 2	5 YR 4/ 1	2.5Y 6/ 2	10 YR 7/ 4	7.5YR 4/ 4	10 YR 4/ 2	10 YR 5/ 2
HR lateral aspect of metaphysis	7.5YR 4/ 2	10 YR 5/ 2	5 YR 3/ 2	10 YR 5/ 2	7.5YR 6/ 2	7.5YR 3/ 2	2.5Y 5/ 1	10 YR 5/ 2
HR caudal aspect of neck	7.5YR 4/ 3	10 YR 3/ 3	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 5/ 2	7.5YR 2/ 3	10 YR 3/ 3	7.5YR 2/ 3
HR caudal aspect of neck	10 YR 3/ 2	7.5YR 2/ 2	7.5YR 2/ 3	10 YR 3/ 3	7.5YR 4/ 3	7.5YR 2/ 3	10 YR 3/ 4	10 YR 3/ 3
HR caudal aspect of metaphysis	7.5Y 4/ 1	N 1.0	2.5Y 4/ 1	5 Y 3/ 1	7.5YR 5/ 2	2.5Y 2/ 2	2.5Y 3/ 2	2.5Y 3/ 2
HR caudal aspect of metaphysis	10 YR 5/ 2	2.5Y 6/ 2	10 YR 5/ 2	2.5Y 7/ 2	7.5YR 6/ 3	10 YR 4/ 3	7.5YR 4/ 4	7.5YR 5/ 3
HR caudal aspect of metaphysis	7.5YR 5/ 3	10 YR 6/ 3	10 YR 6/ 2	2.5Y 8/ 2	10 YR 7/ 2	7.5YR 4/ 3	10 YR 6/ 3	10 YR 6/ 3
HR caudal aspect of metaphysis	5 YR 4/ 3	10 YR 6/ 2	10 YR 5/ 2	7.5YR 7/ 2	10 YR 7/ 3	7.5YR 3/ 2	2.5Y 7/ 2	10 YR 6/ 2
HR medial aspect of neck	10 YR 4/ 2	10 YR 2/ 2	7.5YR 6/ 3	10 YR 5/ 2	2.5Y 5/ 2	10 YR 4/ 3	10 YR 4/ 3	2.5Y 3/ 3
HR caudal aspect of neck	10 YR 5/ 2	7.5YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	2.5Y 6/ 3	10 YR 6/ 2	7.5YR 7/ 3	10 YR 6/ 2
HR medial aspect of metaphysis	10 YR 7/ 2	10 YR 6/ 2	7.5YR 8/ 2	2.5Y 5/ 2	2.5Y 6/ 3	7.5YR 7/ 3	2.5Y 8/ 2	10 YR 6/ 4
HR medial aspect of metaphysis	10 YR 7/ 2	10 YR 4/ 2	7.5YR 7/ 2	7.5YR 5/ 2	10 YR 6/ 4	7.5YR 8/ 2	2.5Y 6/ 3	7.5YR 5/ 3

RIGHT Humerus (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
HR medial aspect of metaphysis	7.5YR 7/ 3	10 YR 5/ 2	7.5YR 7/ 2	10 YR 6/ 2	10 YR 7/ 2	10 YR 8/ 1	10 YR 7/ 3	7.5YR 5/ 3
HR medial aspect of metaphysis	10 Y 7/ 1	7.5YR 3/ 2	7.5YR 6/ 2	5 YR 4/ 2	7.5YR 7/ 2	10 YR 7/ 2	10 YR 7/ 2	5 Y 7/ 2
HR coronoid fossa	2.5Y 2/ 1	2.5Y 2/ 2	5 Y 3/ 1	2.5Y 2/ 2	10 YR 3/ 3	5 Y 3/ 3	2.5Y 2/ 2	5 Y 3/ 2
HR medial epicondyle	7.5YR 3/ 2	10 YR 5/ 2	10 YR 4/ 3	10 YR 5/ 2	10 YR 6/ 4	N/A	10 YR 6/ 3	10 YR 7/ 3
HR medial condyle	10 YR 3/ 2	7.5YR 5/ 3	7.5YR 3/ 2	10 YR 5/ 4	10 YR 6/ 3	7.5YR 7/ 2	7.5YR 5/ 4	10 YR 6/ 2
HR lateral condyle	7.5YR 4/ 2	7.5YR 4/ 3	10 YR 3/ 3	10 YR 5/ 2	10 YR 7/ 2	10 YR 6/ 3	7.5YR 4/ 3	10 YR 6/ 2
HR lateral epicondyle	N 1.0	10 YR 5/ 2	5 YR 3/ 3	7.5YR 4/ 3	10 YR 5/ 3	10 YR 3/ 3	7.5YR 3/ 2	10 YR 4/ 3
HR lateral condyloid crest	7.5YR 3/ 2	10 YR 5/ 2	10 YR 3/ 2	7.5YR 6/ 3	7.5YR 7/ 2	7.5YR 3/ 3	10 Y 7/ 1	10 YR 4/ 2
HR olecranon fossa	7.5YR 2/ 1	2.5Y 3/ 3	5 Y 2/ 1	7.5YR 2/ 3	5 Y 2/ 2	5 Y 2/ 2	2.5Y 2/ 2	10 YR 2/ 2
LEFT RADIUS								
RL proximal epiphysis	10 YR 4/ 3	10 YR 5/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 4/ 2	10 YR 6/ 4	7.5YR 5/ 3	10 YR 3/ 2
RL proximal epiphysis	10 YR 5/ 4	10 YR 5/ 2	10 YR 4/ 3	7.5YR 5/ 2	7.5YR 3/ 2	7.5YR 3/ 3	7.5YR 4/ 3	7.5YR 4/ 2
RL cranial aspect of metaphysis	5 YR 6/ 2	10 YR 5/ 3	10 YR 7/ 2	10 YR 4/ 2	7.5YR 5/ 3	10 YR 7/ 3	10 YR 7/ 4	7.5YR 7/ 2
RL cranial aspect of metaphysis	7.5YR 5/ 2	2.5Y 6/ 2	7.5YR 5/ 3	5 YR 3/ 2	10 YR 6/ 3	10 YR 5/ 3	10 YR 7/ 3	7.5YR 7/ 2
RL cranial aspect of metaphysis	7.5YR 5/ 4	10 YR 8/ 2	10 YR 5/ 3	7.5YR 5/ 3	10 YR 7/ 2	10 YR 7/ 3	10 YR 7/ 2	2.5Y 7/ 1
RL cranial aspect of metaphysis	7.5YR 6/ 3	10 YR 7/ 3	10 YR 5/ 3	7.5YR 5/ 2	7.5YR 4/ 3	10 YR 5/ 3	10 YR 6/ 2	7.5YR 6/ 3
RL lateral aspect of metaphysis	7.5YR 4/ 2	10 YR 5/ 3	7.5YR 5/ 2	10 YR 6/ 2	10 YR 6/ 4	10 YR 7/ 3	10 YR 8/ 2	7.5YR 5/ 3
RL lateral aspect of metaphysis	7.5YR 3/ 3	10 YR 5/ 3	10 YR 3/ 3	7.5YR 6/ 2	10 YR 7/ 2	10 YR 3/ 4	10 YR 7/ 2	7.5YR 5/ 2
RL lateral aspect of metaphysis	2.5Y 6/ 1	10 YR 5/ 3	7.5YR 4/ 3	7.5YR 5/ 3	10 YR 7/ 3	2.5Y 6/ 1	7.5YR 7/ 3	10 YR 5/ 1
RL lateral aspect of metaphysis	7.5YR 5/ 3	10 YR 4/ 3	10 YR 6/ 3	7.5YR 5/ 3	10 YR 5/ 2	10 YR 5/ 2	7.5YR 6/ 4	10 YR 4/ 2
RL caudal aspect of metaphysis	7.5YR 4/ 2	7.5YR 3/ 2	7.5YR 3/ 3	10 YR 7/ 2	7.5YR 6/ 3	10 YR 5/ 4	10 YR 5/ 3	7.5YR 5/ 3
RL caudal aspect of metaphysis	10 YR 4/ 2	7.5YR 2/ 3	10 YR 3/ 2	10 YR 7/ 2	10 YR 5/ 3	7.5YR 2/ 3	10 YR 5/ 2	10 YR 5/ 2
RL caudal aspect of metaphysis	7.5YR 4/ 3	5 YR 2/ 2	7.5YR 2/ 3	2.5Y 7/ 1	10 YR 5/ 3	10 YR 4/ 3	10 YR 5/ 2	10 YR 5/ 2
RL caudal aspect of metaphysis	7.5YR 4/ 3	7.5YR 2/ 1	10 YR 4/ 3	2.5Y 5/ 3	10 YR 4/ 3	10 YR 4/ 3	10 YR 4/ 2	10 YR 4/ 2
RL medial aspect of metaphysis	7.5YR 4/ 3	7.5YR 4/ 2	7.5YR 3/ 2	10 YR 6/ 2	7.5YR 3/ 3	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 6/ 2

LEFT RADIUS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
RL medial aspect of metaphysis	10 YR 4/ 3	7.5YR 2/ 2	10 YR 4/ 2	7.5YR 6/ 3	7.5YR 2/ 2	7.5YR 2/ 2	10 YR 4/ 2	10 YR 5/ 2
RL medial aspect of metaphysis	10 YR 4/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 6/ 3	10 YR 2/ 1	7.5YR 4/ 3	7.5YR 4/ 2	7.5YR 5/ 3
RL medial aspect of metaphysis	10 YR 5/ 2	7.5YR 3/ 1	10 YR 4/ 2	10 YR 5/ 3	7.5YR 3/ 1	10 YR 3/ 3	10 YR 3/ 2	7.5YR 4/ 2
RL distal epiphysis	N/A	7.5YR 7/ 3	10 YR 3/ 4	5 YR 3/ 1	7.5YR 3/ 1	7.5YR 4/ 3	2.5Y 5/ 2	10 YR 5/ 3
RL distal epiphysis	N/A	10 YR 5/ 3	7.5YR 3/ 4	10 YR 6/ 2	10 YR 5/ 4	7.5YR 3/ 4	10 YR 4/ 3	7.5YR 4/ 3
RIGHT RADIUS								
RR proximal epiphysis	7.5YR 3/ 3	7.5YR 4/ 3	10 YR 5/ 3	7.5YR 4/ 4	10 YR 5/ 3	10 YR 4/ 4	10 YR 3/ 4	N/A
RR proximal epiphysis	7.5YR 4/ 2	7.5YR 5/ 4	7.5YR 3/ 2	10 YR 5/ 3	10 YR 6/ 4	7.5YR 3/ 1	7.5YR 5/ 4	N/A
RR cranial aspect of metaphysis	7.5YR 3/ 3	7.5YR 4/ 4	7.5YR 7/ 2	10 YR 6/ 3	7.5YR 6/ 2	10 YR 7/ 2	10 YR 7/ 2	7.5YR 6/ 2
RR cranial aspect of metaphysis	7.5YR 2/ 1	7.5YR 4/ 3	7.5YR 7/ 2	10 YR 7/ 2	7.5YR 6/ 2	10 YR 7/ 2	5 YR 8/ 2	10 YR 6/ 1
RR cranial aspect of metaphysis	7.5YR 3/ 2	5 YR 4/ 3	10 YR 7/ 2	10 YR 7/ 2	7.5YR 6/ 2	7.5YR 8/ 2	7.5YR 8/ 2	10 YR 6/ 2
RR cranial aspect of metaphysis	7.5YR 3/ 3	7.5YR 3/ 2	7.5YR 6/ 2	7.5YR 7/ 3	7.5YR 7/ 2	10 YR 8/ 3	7.5YR 8/ 2	7.5YR 6/ 3
RR lateral aspect of metaphysis	10 YR 3/ 2	10 YR 6/ 3	7.5YR 3/ 1	2.5Y 6/ 1	7.5YR 5/ 3	7.5YR 3/ 2	10 YR 5/ 2	7.5YR 7/ 2
RR lateral aspect of metaphysis	10 YR 5/ 1	7.5YR 4/ 3	2.5Y 4/ 1	7.5YR 5/ 2	5 YR 5/ 2	7.5YR 2/ 3	2.5Y 5/ 2	7.5YR 5/ 2
RR lateral aspect of metaphysis	2.5Y 6/ 1	7.5YR 7/ 3	10 YR 4/ 2	10 YR 5/ 1	10 YR 5/ 2	7.5YR 3/ 3	10 YR 6/ 2	10 YR 6/ 2
RR lateral aspect of metaphysis	7.5YR 5/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 4/ 2	7.5YR 5/ 2	7.5YR 3/ 2	10 YR 5/ 2	7.5YR 7/ 2
RR caudal aspect of metaphysis	10 YR 5/ 3	10 YR 5/ 4	7.5YR 5/ 3	10 YR 7/ 2	10 YR 5/ 3	2.5Y 6/ 3	10 YR 4/ 3	10 YR 6/ 2
RR caudal aspect of metaphysis	2.5Y 5/ 1	10 YR 6/ 2	7.5YR 4/ 3	5 Y 7/ 1	7.5YR 4/ 3	7.5YR 7/ 2	10 YR 4/ 3	10 YR 6/ 2
RR caudal aspect of metaphysis	7.5YR 5/ 2	7.5YR 6/ 2	7.5YR 4/ 3	2.5Y 6/ 1	10 YR 4/ 2	7.5YR 6/ 2	10 YR 6/ 3	10 YR 6/ 2
RR caudal aspect of metaphysis	10 YR 3/ 3	10 YR 4/ 3	2.5Y 3/ 2	2.5Y 5/ 4	10 YR 3/ 2	2.5Y 5/ 3	10 YR 5/ 4	10 YR 6/ 3
RR medial aspect of metaphysis	2.5YR 2/ 2	10 YR 5/ 3	7.5YR 4/ 1	2.5Y 7/ 1	10 YR 5/ 2	2.5Y 7/ 2	7.5YR 7/ 2	7.5YR 5/ 2
RR medial aspect of metaphysis	7.5YR 2/ 2	7.5YR 5/ 3	10 YR 4/ 2	10 YR 7/ 2	10 YR 5/ 2	2.5Y 6/ 1	5 YR 4/ 2	10 YR 6/ 2
RR medial aspect of metaphysis	N 1.0	7.5YR 5/ 3	10 YR 3/ 2	7.5Y 8/ 1	10 YR 5/ 2	7.5YR 7/ 2	5 YR 6/ 2	10 YR 7/ 3
RR medial aspect of metaphysis	7.5YR 2/ 1	7.5YR 4/ 3	7.5YR 3/ 2	5 Y 8/ 1	10 YR 5/ 2	2.5Y 5/ 2	7.5YR 6/ 2	10 YR 7/ 2
RR distal epiphysis	5 YR 2/ 3	10 YR 2/ 1	10 YR 3/ 3	7.5YR 4/ 2	10 YR 4/ 4	7.5YR 7/ 3	10 YR 6/ 4	7.5YR 7/ 3

RIGHT RADIUS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
RR distal epiphysis	5 Y 2/ 2	7.5YR 2/ 1	10 YR 5/ 3	10 YR 4/ 2	10 YR 4/ 3	7.5YR 5/ 2	7.5YR 4/ 4	7.5YR 6/ 3
LEFT ULNA								
UL olecranon epiphysis	N/A	10 YR 6/ 3	7.5YR 7/ 3	10 YR 6/ 2	7.5YR 5/ 3	7.5YR 3/ 3	10 YR 6/ 2	
UL olecranon epiphysis	N/A	7.5YR 3/ 2	10 YR 5/ 2	2.5Y 6/ 1	7.5YR 4/ 1	10 YR 5/ 3	10 YR 7/ 3	
UL cranial aspect of metaphysis	7.5YR 3/ 3	10 YR 3/ 3	10 YR 4/ 2	7.5YR 3/ 2	7.5YR 3/ 2	5 Y 5/ 2	7.5YR 4/ 3	
UL cranial aspect of metaphysis	10 YR 2/ 2	7.5YR 2/ 3	7.5YR 2/ 3	10 YR 3/ 3	7.5YR 2/ 3	7.5YR 2/ 3	7.5YR 2/ 3	
UL cranial aspect of metaphysis	2.5YR 5/ 3	10 YR 5/ 3	10 YR 5/ 3	10 YR 5/ 2	10 YR 5/ 4	7.5YR 3/ 3	10 YR 5/ 4	
UL cranial aspect of metaphysis	10 YR 2/ 1	10 YR 5/ 4	10 YR 5/ 3	2.5Y 5/ 2	7.5YR 4/ 4	7.5YR 3/ 3	10 YR 4/ 3	
UL lateral aspect of metaphysis	2.5Y 5/ 2	10 YR 2/ 2	7.5Y 4/ 1	10 YR 4/ 2	10 YR 5/ 2	2.5Y 7/ 2	2.5Y 5/ 2	
UL lateral aspect of metaphysis	7.5YR 5/ 4	10 YR 4/ 3	10 YR 6/ 2	2.5Y 7/ 1	10 YR 7/ 2	10 YR 7/ 2	10 YR 6/ 2	
UL lateral aspect of metaphysis	7.5YR 5/ 4	10 YR 5/ 3	10 YR 7/ 2	10 YR 6/ 2	2.5Y 8/ 2	10 YR 6/ 3	7.5YR 7/ 3	
UL lateral aspect of metaphysis	10 YR 5/ 3	10 YR 5/ 3	10 YR 6/ 2	10 YR 5/ 4	10 YR 6/ 3	2.5Y 7/ 2	10 YR 5/ 3	
UL caudal aspect of metaphysis	10 YR 3/ 3	10 YR 4/ 2	10 YR 3/ 2	10 YR 5/ 3	10 YR 3/ 2	10 YR 6/ 4	10 YR 5/ 3	
UL caudal aspect of metaphysis	7.5YR 5/ 2	7.5YR 3/ 2	2.5Y 3/ 1	7.5YR 5/ 2	10 YR 3/ 2	7.5YR 4/ 4	10 YR 6/ 3	
UL caudal aspect of metaphysis	10 YR 4/ 3	7.5YR 3/ 2	10 YR 3/ 2	7.5YR 5/ 2	10 YR 2/ 1	10 YR 5/ 2	10 YR 4/ 2	
UL caudal aspect of metaphysis	10 Y 2/ 1	7.5YR 3/ 2	10 YR 3/ 2	7.5YR 5/ 3	10 YR 2/ 1	10 YR 7/ 3	10 YR 3/ 2	
UL medial aspect ofmetaphysis	2.5Y 3/ 2	7.5YR 4/ 3	7.5YR 4/ 2	10 YR 4/ 3	2.5Y 3/ 1	7.5YR 2/ 3	10 YR 5/ 2	7.5YR 4/ 3
UL medial aspect ofmetaphysis	10 YR 3/ 1	10 YR 4/ 2	10 YR 3/ 2	10 YR 5/ 2	5 YR 2/ 1	7.5YR 3/ 3	10 YR 6/ 2	7.5YR 5/ 4
LEFT ULNA (cont'd)								
UL medial aspect ofmetaphysis	10 YR 3/ 2	10 YR 4/ 2	10 YR 2/ 1	10 YR 4/ 2	7.5YR 3/ 1	7.5YR 3/ 2	2.5Y 7/ 2	2.5Y 5/ 3
UL medial aspect ofmetaphysis	7.5YR 2/ 1	7.5YR 4/ 3	7.5YR 4/ 2	10 YR 5/ 3	10 YR 2/ 1	7.5YR 4/ 4	10 YR 6/ 2	7.5YR 5/ 4
RIGHT ULNA								
UR olecranon epiphysis	10 YR 5/ 2	10 YR 4/ 2	10 YR 6/ 3	7.5YR 5/ 4	7.5YR 7/ 1	7.5YR 3/ 3	7.5YR 5/ 3	7.5YR 7/ 3
UR olecranon epiphysis	7.5YR 5/ 2	10 YR 5/ 3	10 YR 4/ 2	10 YR 8/ 3	10 YR 7/ 3	N/A	7.5YR 7/ 4	7.5YR 6/ 2
UR cranial aspect of metaphysis	N 1.0	7.5YR 4/ 3	7.5YR 2/ 3	10 YR 5/ 2	10 YR 4/ 1	10 YR 5/ 3	10 YR 4/ 3	2.5Y 4/ 2

RIGHT ULNA (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
UR cranial aspect of metaphysis	7.5YR 2/ 2	10 YR 3/ 2	10 YR 2/ 2	10 YR 5/ 2	2.5Y 5/ 2	7.5YR 2/ 3	10 YR 3/ 4	10 YR 3/ 2
UR cranial aspect of metaphysis	7.5YR 4/ 2	2.5Y 5/ 2	10 YR 4/ 3	2.5Y 7/ 1	10 YR 7/ 3	7.5YR 7/ 3	10 YR 5/ 4	2.5Y 6/ 2
UR cranial aspect of metaphysis	10 YR 5/ 3	10 YR 6/ 3	10 YR 3/ 2	7.5YR 5/ 3	7.5YR 6/ 3	7.5YR 7/ 4	7.5YR 6/ 4	2.5Y 7/ 2
UR lateral aspect of metaphysis	2.5Y 5/ 1	7.5YR 4/ 3	10 YR 3/ 3	10 YR 5/ 2	10 YR 5/ 2	5 YR 2/ 3	10 YR 3/ 3	7.5YR 5/ 2
UR lateral aspect of metaphysis	7.5YR 3/ 1	10 YR 4/ 2	7.5YR 3/ 3	10 YR 6/ 3	2.5Y 6/ 1	7.5YR 3/ 3	7.5YR 3/ 3	10 YR 5/ 2
UR lateral aspect of metaphysis	10 YR 2/ 1	10 YR 4/ 2	7.5YR 5/ 2	7.5YR 6/ 2	7.5YR 6/ 2	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 6/ 3
UR lateral aspect of metaphysis	10 YR 2/ 1	10 YR 4/ 2	10 YR 4/ 2	7.5YR 5/ 2	7.5YR 6/ 2	10 YR 4/ 4	10 YR 5/ 3	2.5Y 5/ 2
UR caudal aspect of metaphysis	5 YR 2/ 2	7.5YR 4/ 3	10 YR 6/ 3	10 YR 7/ 3	7.5YR 5/ 2	7.5YR 5/ 4	7.5YR 4/ 4	10 YR 6/ 3
UR caudal aspect of metaphysis	7.5YR 3/ 1	10 YR 4/ 3	10 YR 6/ 3	10 YR 6/ 2	7.5YR 5/ 2	7.5YR 6/ 4	10 YR 5/ 3	10 YR 6/ 2
UR caudal aspect of metaphysis	5 YR 2/ 1	10 YR 5/ 3	10 YR 3/ 2	2.5Y 6/ 1	7.5YR 4/ 2	10 YR 2/ 2	7.5YR 6/ 3	10 YR 5/ 2
UR caudal aspect of metaphysis	7.5YR 3/ 2	10 YR 4/ 3	10 YR 3/ 2	10 YR 7/ 3	10 YR 5/ 3	7.5YR 6/ 3	10 YR 4/ 3	2.5Y 5/ 2
UR medial aspect of metaphysis	7.5YR 3/ 2	10 YR 6/ 3	10 YR 6/ 2	2.5Y 6/ 3	10 YR 5/ 2	10 YR 7/ 2	10 YR 5/ 3	10 YR 5/ 2
UR medial aspect of metaphysis	7.5YR 3/ 2	10 YR 7/ 2	7.5YR 8/ 2	10 YR 8/ 2	2.5Y 4/ 2	2.5Y 4/ 3	10 YR 6/ 4	10 YR 6/ 3
UR medial aspect of metaphysis	7.5YR 5/ 3	7.5YR 7/ 3	10 YR 5/ 3	10 YR 7/ 3	10 YR 6/ 2	7.5YR 8/ 2	10 YR 7/ 2	10 YR 7/ 2
UR medial aspect of metaphysis	10 YR 5/ 2	2.5Y 6/ 2	2.5Y 6/ 3	10 YR 7/ 4	10 YR 5/ 2	10 YR 7/ 2	7.5YR 7/ 3	7.5YR 6/ 3
LEFT 3RD METACARPAL								
MC L3 dorsal aspect	7.5YR 4/ 3	10 YR 3/ 2	2.5Y 3/ 1	5 YR 2/ 2	2.5Y 5/ 2	7.5YR 4/ 3	7.5YR 3/ 2	7.5YR 6/ 3
MC L3 dorsal aspect	7.5YR 2/ 2	7.5YR 4/ 3	7.5YR 3/ 1	7.5YR 4/ 2	10 YR 5/ 2	7.5YR 3/ 1	7.5YR 4/ 2	10 YR 6/ 2
MC L3 volar aspect	10 YR 4/ 2	2.5Y 7/ 2	10 YR 6/ 3	7.5YR 3/ 2	10 YR 4/ 3	7.5YR 6/ 2	10 YR 5/ 3	10 YR 6/ 2
MC L3 volar aspect	10 YR 3/ 3	10 YR 7/ 2	10 YR 5/ 3	7.5YR 3/ 2	10 YR 5/ 2	10 YR 6/ 2	10 YR 5/ 2	7.5YR 6/ 3
LEFT 4TH METACARPAL								
MC L4 dorsal aspect	7.5YR 3/ 2	10 YR 6/ 3	10 YR 6/ 3	10 YR 6/ 4	10 YR 3/ 2	7.5YR 3/ 3	7.5YR 4/ 2	10 YR 6/ 3
MC L4 dorsal aspect	5 YR 2/ 2	10 YR 7/ 3	10 YR 5/ 3	10 YR 6/ 3	10 YR 2/ 1	7.5YR 3/ 2	10 YR 3/ 1	7.5YR 6/ 3
MC L4 volar aspect	2.5Y 2/ 2	10 YR 4/ 2	10 YR 6/ 4	7.5YR 4/ 4	7.5YR 3/ 3	10 YR 6/ 2	7.5YR 4/ 1	10 YR 6/ 3
MC L4 volar aspect	5 YR 2/ 2	10 YR 3/ 3	10 YR 6/ 3	10 YR 4/ 2	7.5YR 3/ 3	7.5YR 7/ 3	10 YR 3/ 1	10 YR 6/ 2

RIGHT 3RD METACARPAL	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
MC R3 dorsal aspect	7.5YR 6/ 3	7.5YR 6/ 4	10 YR 8/ 4	10 YR 3/ 2	2.5Y 6/ 1	7.5YR 4/ 3	10 YR 5/ 2	7.5YR 4/ 3
MC R3 dorsal aspect	7.5YR 5/ 4	10 YR 3/ 3	10 YR 6/ 3	10 YR 3/ 2	7.5YR 7/ 1	10 YR 4/ 3	7.5YR 3/ 2	7.5YR 4/ 3
MC R3 volar aspect	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 6/ 4	10 YR 7/ 3	10 YR 7/ 2	7.5YR 5/ 3	7.5YR 7/ 3	7.5YR 5/ 4
MC R3 volar aspect	10 YR 3/ 2	7.5YR 2/ 2	10 YR 3/ 2	10 Y 7/ 1	2.5Y 5/ 3	5 YR 6/ 3	7.5YR 4/ 3	10 YR 5/ 3
RIGHT 4TH METACARPAL								
MC R4 dorsal aspect	7.5YR 4/ 4	10 YR 2/ 2	7.5YR 3/ 1	10 YR 5/ 2	10 YR 5/ 2	10 YR 6/ 3	10 YR 5/ 2	7.5YR 3/ 1
MC R4 dorsal aspect	10 YR 5/ 4	10 YR 3/ 2	7.5YR 3/ 2	7.5YR 8/ 2	7.5YR 6/ 3	10 YR 6/ 3	7.5YR 5/ 4	5 YR 3/ 2
MC R4 volar aspect	7.5YR 2/ 2	7.5YR 3/ 3	7.5YR 5/ 4	10 YR 6/ 3	10 YR 6/ 4	7.5YR 6/ 3	7.5YR 5/ 3	7.5YR 5/ 3
MC R4 volar aspect	7.5YR 2/ 2	7.5YR 2/ 2	7.5YR 4/ 2	10 YR 5/ 2	10 YR 6/ 4	10 YR 6/ 2	7.5YR 4/ 3	7.5YR 4/ 3
LEFT 1ST & 2ND METACARPALS								
MC L1 dorsal aspect	7.5YR 5/ 1	10 YR 7/ 3	5 YR 2/ 2	7.5YR 8/ 2	10 YR 3/ 2	7.5YR 4/ 3	7.5YR 5/ 3	10 YR 6/ 3
MC L1 dorsal aspect	10 YR 5/ 2	10 YR 5/ 2	10 YR 4/ 1	7.5YR 7/ 3	10 YR 2/ 1	7.5YR 3/ 3	10 YR 7/ 2	10 YR 5/ 2
MC L1 volar aspect	7.5YR 3/ 2	10 YR 5/ 2	10 YR 6/ 3	7.5YR 4/ 4	7.5YR 4/ 3	10 YR 4/ 3	2.5Y 5/ 2	10 YR 5/ 2
MC L1 volar aspect	7.5YR 3/ 2	10 YR 4/ 2	2.5Y 3/ 4	7.5YR 5/ 3	10 YR 2/ 1	10 YR 4/ 3	7.5YR 5/ 4	10 YR 5/ 2
MC L2 dorsal aspect	5 YR 2/ 2	7.5YR 4/ 3	10 YR 2/ 1	2.5Y 5/ 2	10 YR 5/ 2	7.5YR 4/ 4	7.5YR 4/ 2	10 YR 6/ 4
MC L2 dorsal aspect	7.5YR 3/ 2	10 YR 3/ 2	2.5Y 2/ 2	10 YR 7/ 2	10 YR 4/ 1	7.5YR 3/ 2	10 YR 5/ 2	10 YR 5/ 3
MC L2 volar aspect	7.5YR 2/ 1	10 YR 6/ 2	7.5YR 2/ 2	10 YR 4/ 3	7.5YR 3/ 2	7.5YR 8/ 2	10 YR 6/ 3	10 YR 5/ 3
MC L2 volar aspect	5 YR 2/ 2	7.5YR 3/ 2	10 YR 3/ 2	7.5YR 2/ 2	7.5YR 4/ 4	10 YR 5/ 3	10 YR 5/ 2	7.5YR 4/ 4
RIGHT 1ST & 2ND METACARPALS								
MC R1 dorsal aspect	7.5YR 5/ 2	2.5Y 2/ 1	2.5Y 3/ 2	10 YR 5/ 2	10 YR 7/ 3	7.5YR 4/ 4	10 YR 6/ 3	10 YR 2/ 1
MC R1 dorsal aspect	10 YR 5/ 1	7.5YR 2/ 2	2.5Y 6/ 2	10 YR 6/ 2	10 YR 6/ 6	10 YR 6/ 3	2.5Y 6/ 2	7.5YR 3/ 2
MC R1 volar aspect	7.5YR 4/ 2	7.5YR 3/ 2	7.5YR 4/ 3	10 YR 7/ 2	7.5YR 5/ 3	10 YR 6/ 3	10 YR 5/ 4	10 YR 5/ 3
MC R1 volar aspect	7.5YR 5/ 2	7.5YR 2/ 2	10 YR 4/ 2	10 YR 3/ 3	10 YR 6/ 3	10 YR 6/ 3	7.5YR 6/ 4	10 YR 5/ 3
MC R2 dorsal aspect	7.5YR 4/ 4	10 YR 3/ 2	7.5YR 5/ 3	7.5YR 5/ 2	7.5YR 6/ 3	7.5YR 6/ 3	N/A	N/A
MC R2 dorsal aspect	10 YR 5/ 3	10 YR 4/ 2	10 YR 6/ 3	7.5YR 4/ 3	7.5YR 6/ 3	10 YR 4/ 2	N/A	N/A

RIGHT 1ST & 2ND METACARPALS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
MC R2 volar aspect	7.5YR 3/ 2	10 YR 5/ 4	10 YR 5/ 3	2.5Y 3/ 1	2.5Y 7/ 4	10 YR 6/ 2	N/A	N/A
MC R2 volar aspect	7.5YR 4/ 2	7.5YR 4/ 3	10 YR 7/ 3	2.5Y 3/ 1	7.5YR 6/ 4	5 Y 6/ 3	N/A	N/A
LEFT FEMUR								
FL head epiphysis	10 YR 6/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 5/ 3	2.5PB 2/ 1	7.5YR 3/ 2	7.5YR 4/ 3	7.5YR 4/ 3
FL head epiphysis	7.5YR 4/ 4	7.5YR 4/ 3	2.5Y 4/ 1	10 YR 4/ 2	10 YR 4/ 1	7.5YR 3/ 2	10 YR 6/ 3	7.5YR 4/ 3
FL trochanter epiphysis	7.5YR 4/ 2	10 YR 5/ 3	7.5YR 5/ 3	7.5YR 7/ 2	N 2.0	10 YR 3/ 2	10 YR 5/ 4	10 YR 6/ 4
FL trochanter epiphysis	10 YR 4/ 2	7.5YR 5/ 4	10 YR 5/ 2	10 YR 8/ 2	10 YR 2/ 1	10 YR 4/ 3	7.5YR 5/ 4	10 YR 6/ 4
FL neck	10 YR 3/ 3	2.5Y 4/ 2	10 YR 2/ 2	2.5Y 4/ 2	N 1.5	10 YR 3/ 3	10 YR 3/ 3	7.5YR 2/ 3
FL neck	2.5Y 4/ 3	10 YR 4/ 2	7.5YR 2/ 2	7.5YR 5/ 3	N 2.0	7.5YR 3/ 2	7.5YR 4/ 3	10 YR 3/ 3
FL anterior aspect of metaphysis	7.5YR 5/ 3	7.5YR 5/ 3	10 YR 5/ 2	10 YR 6/ 3	7.5Y 2/ 1	7.5YR 6/ 4	7.5YR 5/ 4	10 YR 4/ 3
FL anterior aspect of metaphysis	10 YR 6/ 2	7.5YR 5/ 3	10 YR 6/ 3	10 YR 6/ 3	10 YR 2/ 1	7.5YR 6/ 3	7.5YR 6/ 3	10 YR 5/ 3
FL anterior aspect of metaphysis	10 YR 6/ 2	10 YR 6/ 3	2.5Y 6/ 3	10 YR 7/ 3	10 YR 6/ 4	7.5YR 6/ 3	2.5Y 5/ 3	10 YR 7/ 4
FL anterior aspect of metaphysis	10 YR 5/ 2	7.5YR 5/ 4	10 YR 5/ 3	10 YR 6/ 3	10 YR 5/ 2	10 YR 4/ 3	10 YR 5/ 2	10 YR 7/ 2
FL anterior aspect of metaphysis	7.5YR 2/ 3	7.5YR 4/ 4	7.5YR 3/ 3	10 YR 5/ 2	10 YR 4/ 3	7.5YR 5/ 3	7.5YR 5/ 4	10 YR 5/ 3
FL lateral aspect of metaphysis	7.5YR 5/ 3	7.5YR 5/ 4	10 YR 6/ 3	10 YR 6/ 3	10 YR 5/ 3	10 YR 5/ 2	7.5YR 5/ 3	7.5YR 6/ 4
FL lateral aspect of metaphysis	2.5Y 3/ 2	10 YR 4/ 3	7.5YR 4/ 3	10 YR 7/ 2	10 YR 4/ 2	7.5YR 6/ 2	10 YR 5/ 3	10 YR 7/ 3
FL lateral aspect of metaphysis	10 YR 4/ 2	10 YR 4/ 3	10 YR 6/ 3	10 YR 7/ 3	7.5YR 5/ 3	10 YR 5/ 2	2.5Y 6/ 2	10 YR 7/ 3
FL lateral aspect of metaphysis	10 YR 4/ 2	7.5YR 2/ 3	10 YR 5/ 3	7.5YR 4/ 4	10 YR 4/ 2	10 YR 6/ 2	2.5Y 5/ 2	10 YR 7/ 3
FL lateral aspect of metaphysis	10 YR 2/ 2	7.5YR 3/ 3	7.5YR 2/ 3	10 YR 4/ 4	10 YR 3/ 2	10 YR 6/ 2	7.5YR 5/ 4	7.5YR 5/ 3
FL posterior aspect of metaphysis	10 YR 4/ 3	7.5YR 3/ 3	7.5YR 3/ 1	10 YR 5/ 2	10 YR 2/ 1	10 YR 4/ 2	7.5YR 5/ 4	10 YR 5/ 3
FL posterior aspect of metaphysis	7.5YR 3/ 3	7.5YR 3/ 3	10 YR 5/ 2	10 YR 6/ 2	10 YR 2/ 1	7.5YR 5/ 4	10 YR 6/ 3	10 YR 5/ 3
FL posterior aspect of metaphysis	10 YR 3/ 2	7.5YR 3/ 2	10 YR 5/ 2	7.5YR 7/ 2	10 YR 2/ 1	7.5YR 3/ 3	10 YR 6/ 2	7.5YR 5/ 3
FL posterior aspect of metaphysis	10 YR 4/ 3	7.5YR 3/ 2	10 YR 3/ 2	10 YR 6/ 2	10 YR 2/ 1	7.5YR 5/ 4	10 YR 4/ 2	7.5YR 6/ 3
FL posterior aspect of metaphysis	7.5YR 5/ 1	10 YR 2/ 2	10 YR 3/ 2	10 YR 3/ 3	7.5YR 2/ 1	10 YR 4/ 3	2.5Y 4/ 3	7.5YR 3/ 3
FL medial aspect of metaphysis	10 YR 3/ 3	2.5Y 4/ 2	10 YR 5/ 2	10 YR 4/ 2	N 1.5	10 YR 3/ 2	2.5GY 4/ 2	7.5YR 4/ 3

LEFT FEMUR (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
FL medial aspect of metaphysis	10 YR 6/ 2	10 YR 6/ 3	10 YR 4/ 3	10 YR 5/ 2	N 2.5	7.5YR 4/ 3	10 YR 4/ 2	10 YR 5/ 3
FL medial aspect of metaphysis	7.5YR 6/ 3	10 YR 6/ 4	10 YR 4/ 3	7.5YR 5/ 3	10 YR 2/ 1	7.5YR 3/ 2	10 YR 5/ 3	10 YR 5/ 3
FL medial aspect of metaphysis	10 YR 7/ 2	7.5YR 3/ 2	10 YR 5/ 2	7.5YR 6/ 2	N/A	7.5YR 3/ 2	10 YR 6/ 3	10 YR 6/ 2
FL medial aspect of metaphysis	7.5YR 8/ 2	7.5YR 3/ 2	2.5Y 6/ 2	10 YR 5/ 2	7.5YR 2/ 2	5 YR 2/ 2	10 YR 5/ 3	10 YR 5/ 3
FL medial epicondyle	10 YR 4/ 3	5 YR 3/ 4	10 YR 5/ 2	7.5YR 5/ 2	10 YR 6/ 3	7.5YR 2/ 1	10 YR 5/ 3	7.5YR 5/ 3
FL medial epicondyle	7.5YR 3/ 2	7.5YR 3/ 3	7.5YR 3/ 3	10 YR 6/ 2	10 YR 6/ 2	7.5YR 2/ 2	7.5YR 4/ 4	5 YR 4/ 3
FL medial condyle	7.5YR 4/ 3	7.5YR 4/ 2	7.5YR 3/ 2	10 YR 7/ 2	10 YR 4/ 3	7.5YR 3/ 3	7.5YR 4/ 4	10 YR 5/ 2
FL medial condyle	7.5YR 3/ 3	7.5YR 3/ 2	7.5YR 3/ 2	10 YR 4/ 3	2.5Y 3/ 1	7.5YR 3/ 2	7.5YR 4/ 3	7.5YR 5/ 2
FL lateral epicondyle	5 YR 2/ 2	10 YR 3/ 3	7.5YR 4/ 3	10 YR 4/ 3	10 YR 6/ 2	10 YR 6/ 2	7.5YR 4/ 4	10 YR 4/ 2
FL lateral epicondyle	10 YR 4/ 2	7.5YR 2/ 3	10 YR 6/ 3	7.5YR 7/ 3	10 YR 4/ 2	10 YR 7/ 1	10 YR 6/ 4	7.5YR 6/ 4
FL lateral condyle	7.5YR 5/ 3	7.5YR 3/ 3	10 YR 4/ 2	10 YR 6/ 3	N 1.5	7.5YR 6/ 3	7.5YR 3/ 2	7.5YR 6/ 3
FL lateral condyle	7.5YR 3/ 3	7.5YR 3/ 3	7.5YR 4/ 3	7.5YR 5/ 3	2.5Y 2/ 1	10 YR 5/ 3	7.5YR 5/ 4	7.5YR 5/ 3
FL trochlea	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 3/ 2	10 YR 6/ 2	N 1.5	10 YR 2/ 1	7.5YR 4/ 4	5 YR 5/ 2
FL trochlea	10 YR 2/ 2	10 YR 2/ 2	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 6/ 3	10 YR 2/ 1	7.5YR 5/ 4	5 YR 4/ 2
FL intercondyloid fossa	7.5YR 2/ 1	7.5YR 2/ 3	5 Y 2/ 2	10 YR 2/ 2	10 YR 3/ 3	7.5YR 2/ 3	7.5YR 2/ 3	10 YR 3/ 2
RIGHT FEMUR								
FR head epiphysis	10 YR 3/ 3	5 YR 3/ 2	10 YR 4/ 3	10 YR 8/ 3	N 2.0	2.5Y 2/ 1	7.5YR 6/ 3	7.5YR 5/ 2
FR head epiphysis	10 YR 4/ 6	5 YR 3/ 2	7.5YR 4/ 3	10 YR 5/ 3	N 2.5	7.5YR 3/ 3	7.5YR 5/ 2	7.5YR 5/ 3
FR trochanter epiphysis	N/A	10 YR 5/ 3	2.5Y 4/ 2	10 YR 6/ 2	7.5YR 3/ 2	10 YR 6/ 2	N/A	2.5Y 6/ 2
FR trochanter epiphysis	N/A	10 YR 3/ 2	10 YR 5/ 2	10 YR 6/ 2	10 YR 5/ 2	10 YR 6/ 2	N/A	10 YR 5/ 2
FR neck	10 YR 2/ 2	10 YR 3/ 3	10 YR 3/ 2	7.5YR 5/ 4	7.5YR 3/ 2	7.5YR 4/ 3	10 YR 4/ 3	7.5YR 3/ 3
FR neck	7.5YR 2/ 3	7.5YR 2/ 2	7.5YR 3/ 3	10 YR 3/ 3	5 YR 3/ 4	10 YR 4/ 2	10 YR 4/ 2	2.5Y 2/ 2
FR anterior aspect of metaphysis	10 YR 5/ 1	7.5YR 3/ 2	10 YR 6/ 2	10 YR 4/ 3	2.5Y 3/ 1	7.5YR 6/ 2	2.5Y 6/ 1	10 YR 6/ 2
FR anterior aspect of metaphysis	10 YR 5/ 2	10 YR 3/ 2	2.5Y 6/ 1	10 YR 7/ 3	10 YR 4/ 2	7.5YR 6/ 2	2.5Y 7/ 1	10 YR 6/ 2
FR anterior aspect of metaphysis	10 YR 5/ 2	7.5YR 5/ 3	10 YR 6/ 2	10 YR 7/ 2	5 YR 5/ 2	5 YR 7/ 2	5 Y 6/ 1	10 YR 6/ 2

RIGHT FEMUR (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
FR anterior aspect of metaphysis	10 YR 5/ 2	10 YR 5/ 3	7.5YR 5/ 3	10 YR 7/ 3	10 YR 6/ 2	5 YR 7/ 2	2.5Y 5/ 2	7.5YR 5/ 2
FR anterior aspect of metaphysis	7.5YR 3/ 3	10 YR 3/ 3	7.5YR 5/ 3	7.5YR 5/ 3	10 YR 4/ 2	7.5YR 6/ 2	10 YR 5/ 3	7.5YR 5/ 2
FR lateral aspect of metaphysis	7.5YR 6/ 2	7.5YR 3/ 2	7.5YR 5/ 2	7.5YR 6/ 3	10 YR 6/ 3	10 YR 6/ 2	10 YR 5/ 2	10 YR 5/ 2
FR lateral aspect of metaphysis	2.5Y 6/ 1	7.5YR 4/ 3	10 YR 6/ 1	7.5YR 7/ 1	2.5Y 5/ 2	7.5YR 6/ 2	5 YR 5/ 2	10 YR 6/ 2
FR lateral aspect of metaphysis	7.5YR 4/ 2	10 YR 4/ 3	7.5YR 6/ 2	7.5YR 7/ 1	2.5Y 6/ 2	7.5YR 6/ 2	2.5Y 6/ 2	10 YR 7/ 2
FR lateral aspect of metaphysis	7.5YR 3/ 2	7.5YR 3/ 3	7.5YR 5/ 2	10 YR 6/ 2	10 YR 4/ 2	10 YR 5/ 2	7.5YR 5/ 3	5 YR 5/ 3
FR lateral aspect of metaphysis	7.5YR 2/ 3	10 YR 3/ 3	7.5YR 4/ 3	7.5YR 6/ 2	7.5YR 3/ 2	7.5YR 5/ 3	2.5YR 3/ 3	7.5YR 5/ 3
FR posterior aspect of metaphysis	7.5YR 3/ 3	10 YR 3/ 4	10 YR 4/ 2	10 YR 7/ 2	7.5YR 6/ 2	N/A	7.5YR 5/ 4	10 YR 3/ 2
FR posterior aspect of metaphysis	7.5YR 5/ 3	7.5YR 4/ 4	10 YR 5/ 2	7.5YR 6/ 3	2.5Y 8/ 1	10 YR 2/ 1	10 YR 7/ 3	10 YR 4/ 2
FR posterior aspect of metaphysis	10 YR 5/ 2	10 YR 4/ 3	10 YR 5/ 2	10 YR 6/ 2	7.5YR 5/ 6	10 YR 2/ 1	7.5YR 5/ 4	10 YR 5/ 2
FR posterior aspect of metaphysis	10 YR 5/ 2	10 YR 6/ 3	2.5Y 5/ 1	10 YR 7/ 2	10 YR 7/ 2	N/A	2.5Y 5/ 3	10 YR 5/ 2
FR posterior aspect of metaphysis	7.5YR 2/ 2	7.5YR 2/ 3	10 YR 3/ 2	10 YR 5/ 2	10 YR 5/ 2	N/A	7.5YR 3/ 3	7.5YR 3/ 3
FR medial aspect of metaphysis	10 YR 3/ 2	10 YR 5/ 3	2.5Y 3/ 1	10 YR 6/ 3	10 YR 6/ 2	10 YR 4/ 4	10 YR 4/ 3	10 YR 3/ 2
FR medial aspect of metaphysis	10 YR 7/ 2	10 YR 5/ 4	10 YR 4/ 2	10 YR 7/ 2	N/A	7.5YR 4/ 4	10 YR 6/ 2	10 YR 5/ 2
FR medial aspect of metaphysis	10 YR 7/ 2	2.5Y 6/ 3	10 YR 3/ 2	10 YR 6/ 3	10 YR 6/ 3	7.5YR 4/ 4	10 YR 6/ 3	10 YR 4/ 2
FR medial aspect of metaphysis	10 YR 6/ 2	10 YR 6/ 3	7.5YR 5/ 2	2.5Y 8/ 3	10 YR 6/ 4	10 YR 3/ 3	7.5YR 5/ 3	10 YR 4/ 2
FR medial aspect of metaphysis	7.5YR 2/ 3	10 YR 4/ 3	10 YR 4/ 2	10 YR 7/ 6	7.5YR 6/ 3	7.5YR 2/ 2	7.5YR 4/ 3	10 YR 5/ 2
FR medial epicondyle	7.5YR 3/ 3	10 YR 6/ 2	5 YR 4/ 3	10 YR 7/ 2	7.5YR 5/ 3	7.5YR 2/ 1	7.5YR 5/ 4	10 YR 4/ 2
FR medial epicondyle	10 YR 5/ 3	10 YR 4/ 2	7.5YR 7/ 3	7.5YR 8/ 2	10 YR 5/ 3	7.5YR 2/ 1	10 YR 5/ 4	10 YR 6/ 2
FR medial condyle	5 YR 2/ 2	10 YR 6/ 3	10 YR 6/ 3	10 YR 5/ 3	7.5YR 4/ 3	10 YR 2/ 1	10 YR 6/ 4	10 YR 6/ 4
FR medial condyle	7.5YR 4/ 3	10 YR 6/ 3	10 YR 5/ 2	10 YR 5/ 3	10 YR 6/ 2	N/A	10 YR 4/ 3	10 YR 6/ 4
FR lateral epicondyle	5 YR 2/ 2	7.5YR 2/ 2	10 YR 3/ 2	7.5YR 3/ 3	10 YR 2/ 2	10 YR 3/ 2	7.5YR 5/ 3	10 YR 5/ 3
FR lateral epicondyle	7.5YR 3/ 2	10 YR 3/ 2	7.5YR 4/ 3	10 YR 7/ 3	10 YR 2/ 1	10 YR 5/ 2	10 YR 6/ 3	7.5YR 5/ 3
FR lateral condyle	7.5YR 3/ 2	10 YR 4/ 4	7.5YR 4/ 2	10 YR 6/ 2	10 YR 3/ 2	10 YR 2/ 1	10 YR 5/ 2	10 YR 5/ 4
FR lateral condyle	7.5YR 3/ 3	7.5YR 3/ 2	7.5YR 5/ 2	7.5YR 5/ 4	10 YR 7/ 3	10 YR 2/ 1	10 YR 6/ 2	7.5YR 4/ 3

RIGHT FEMUR (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
FR trochlea	7.5YR 3/ 3	7.5YR 3/ 2	7.5YR 6/ 2	7.5YR 5/ 4	10 YR 4/ 2	10 YR 2/ 1	10 YR 6/ 2	5 Y 5/ 3
FR trochlea	7.5YR 4/ 3	7.5YR 3/ 3	7.5YR 6/ 2	10 YR 5/ 3	10 YR 3/ 2	10 YR 2/ 1	7.5YR 5/ 3	10 YR 5/ 4
FR intercondyloid fossa	10 YR 3/ 3	10 YR 2/ 2	7.5YR 4/ 2	10 YR 2/ 2	7.5YR 3/ 3	10 YR 3/ 3	10 YR 2/ 2	2.5Y 2/ 2
Patellae								
PU anterior aspect	10 Y 4/ 3	7.5YR 3/ 1	7.5YR 6/ 3	10 YR 8/ 3	N 2.5	N 2.0	10 YR 8/ 3	2.5Y 6/ 1
PU anterior aspect	7.5YR 4/ 3	5 YR 3/ 4	10 YR 5/ 2	10 YR 8/ 2	N 2.0	5 YR 7/ 2	10 YR 7/ 4	10 YR 6/ 2
PU posterior aspect	2.5YR 4/ 2	7.5YR 4/ 4	5 YR 3/ 2	7.5YR 5/ 4	N 3.5	5 YR 3/ 3	10 YR 5/ 4	5 Y 6/ 1
PU posterior aspect	5 YR 3/ 4	7.5YR 3/ 2	7.5YR 5/ 2	10 YR 5/ 4	N 1.5	10 YR 4/ 3	10 YR 6/ 4	2.5Y 7/ 1
PU anterior aspect	N/A	10 YR 2/ 1	10 YR 4/ 3	N/A	10 YR 2/ 1	10 YR 6/ 2	10 YR 6/ 2	N/A
PU anterior aspect	N/A	5 YR 3/ 4	7.5YR 5/ 3	N/A	7.5YR 6/ 3	10 YR 5/ 3	2.5Y 7/ 1	N/A
PU posterior aspect	N/A	10 YR 5/ 3	2.5Y 6/ 2	N/A	10 YR 5/ 3	10 YR 6/ 4	7.5YR 5/ 3	N/A
PU posterior aspect	N/A	10 YR 4/ 3	10 YR 4/ 3	N/A	10 YR 6/ 2	7.5YR 2/ 1	10 YR 6/ 2	N/A
LEFT TIBIA								
TL medial condyle prox epiphysis	7.5YR 3/ 3	7.5YR 4/ 3	7.5YR 5/ 2	10 YR 5/ 2	7.5YR 4/ 1	10 YR 6/ 4	7.5YR 4/ 4	10 YR 6/ 3
TL medial condyle prox epiphysis	7.5YR 4/ 2	7.5YR 4/ 4	7.5YR 5/ 2	7.5YR 6/ 1	N 4.5	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 6/ 4
TL spine of tibia prox epiphysis	7.5YR 3/ 2	7.5YR 4/ 4	7.5YR 3/ 2	7.5YR 5/ 2	N 3.5	10 YR 4/ 3	7.5YR 3/ 3	10 YR 5/ 3
TL lateral condyle prox epiphysis	10 YR 3/ 3	7.5YR 4/ 4	10 YR 3/ 3	5 YR 6/ 2	10 YR 3/ 1	7.5YR 6/ 2	10 YR 5/ 4	2.5Y 4/ 2
TL lateral condyle prox epiphysis	2.5Y 6/ 1	7.5YR 4/ 4	5 YR 4/ 3	7.5YR 5/ 3	N 2.5	10 YR 5/ 3	7.5YR 4/ 3	10 YR 5/ 3
TL crest of tibia	7.5YR 4/ 2	10 YR 4/ 4	2.5Y 3/ 2	10 YR 4/ 2	N/A	10 YR 2/ 2	7.5YR 4/ 4	7.5YR 4/ 4
TL crest of tibia	7.5YR 2/ 3	10 YR 3/ 3	7.5YR 4/ 2	10 YR 4/ 2	N/A	10 YR 2/ 2	10 YR 5/ 4	10 YR 7/ 3
TL anterior aspect of metaphysis	5 YR 3/ 3	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 5/ 3	2.5Y 2/ 1	7.5YR 3/ 3	10 YR 5/ 2	10 YR 7/ 2
TL anterior aspect of metaphysis	5 Y 3/ 2	10 YR 4/ 3	10 YR 4/ 2	7.5YR 5/ 2	2.5G 2/ 2	10 YR 3/ 3	10 YR 6/ 3	7.5YR 7/ 2
TL anterior aspect of metaphysis	2.5Y 5/ 2	10 YR 4/ 3	10 YR 3/ 1	7.5YR 5/ 3	7.5YR 4/ 3	7.5YR 2/ 2	7.5YR 5/ 4	5 Y 6/ 1
TL anterior aspect of metaphysis	5 Y 5/ 1	7.5YR 5/ 4	7.5YR 4/ 4	7.5YR 5/ 3	7.5YR 3/ 3	10 YR 4/ 3	10 YR 5/ 3	10 YR 7/ 2
TL posterior aspect of metaphysis	5 Y 4/ 2	7.5YR 2/ 2	2.5Y 4/ 3	10 YR 6/ 3	2.5Y 2/ 2	10 YR 5/ 2	7.5YR 2/ 2	2.5GY 4/ 2

LEFT TIBIA (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
TL posterior aspect of metaphysis	10 YR 3/ 1	7.5YR 3/ 3	10 YR 7/ 2	7.5Y 8/ 1	10 YR 5/ 3	7.5YR 7/ 2	7.5YR 6/ 4	7.5YR 6/ 2
TL posterior aspect of metaphysis	7.5YR 5/ 3	7.5YR 3/ 3	10 YR 8/ 2	5 Y 8/ 1	2.5Y 6/ 3	7.5YR 7/ 2	7.5YR 5/ 4	7.5YR 7/ 2
TL posterior aspect of metaphysis	7.5YR 3/ 3	10 YR 5/ 4	10 YR 7/ 2	10 YR 7/ 2	10 YR 5/ 3	7.5YR 5/ 3	10 YR 4/ 2	10 YR 6/ 2
TL medial malleolus dist epiphysis	7.5Y 3/ 4	10 YR 5/ 3	7.5YR 3/ 2	10 YR 2/ 2	10 YR 5/ 3	2.5Y 3/ 3	7.5YR 4/ 4	7.5YR 5/ 1
TL medial malleolus dist epiphysis	10 YR 2/ 2	2.5Y 4/ 3	7.5YR 2/ 3	10 YR 5/ 4	10 YR 3/ 2	10 YR 5/ 4	7.5YR 2/ 3	10 YR 5/ 1
RIGHT TIBIA								
TR medial condyle prox epiphysis	7.5YR 3/ 3	7.5YR 3/ 3	10 YR 5/ 2	5 YR 5/ 3	10 YR 5/ 3	N/A	10 YR 5/ 3	10 YR 6/ 2
TR medial condyle prox epiphysis	5 Y 3/ 4	7.5YR 3/ 3	7.5YR 5/ 2	10 YR 5/ 2	7.5YR 6/ 3	N/A	7.5YR 5/ 4	10 YR 5/ 2
TR spine of tibia prox epiphysis	7.5YR 3/ 1	10 YR 3/ 4	7.5YR 4/ 2	10 YR 4/ 3	10 YR 5/ 3	10 YR 5/ 3	7.5YR 5/ 4	10 YR 4/ 2
TR lateral condyle prox epiphysis	10 YR 3/ 2	7.5YR 4/ 4	7.5YR 5/ 3	10 YR 5/ 4	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 6/ 4	5 YR 6/ 2
TR lateral condyle prox epiphysis	7.5YR 3/ 2	10 YR 5/ 4	2.5Y 6/ 1	7.5YR 6/ 2	10 YR 6/ 3	10 YR 2/ 1	10 YR 6/ 4	7.5YR 5/ 3
TR crest of tibia	7.5YR 2/ 3	10 YR 3/ 3	10 YR 4/ 2	7.5YR 4/ 3	N 1.5	N 2.0	7.5YR 3/ 2	10 YR 4/ 2
TR crest of tibia	7.5YR 4/ 4	7.5YR 4/ 4	10 YR 5/ 2	10 YR 5/ 2	10 YR 2/ 1	N 2.5	7.5YR 2/ 2	10 YR 6/ 3
TR anterior aspect of metaphysis	7.5YR 2/ 3	10 YR 4/ 3	10 YR 6/ 1	10 YR 5/ 2	2.5Y 5/ 2	10 YR 6/ 4	2.5Y 4/ 3	7.5YR 5/ 3
TR anterior aspect of metaphysis	5 YR 3/ 4	10 YR 3/ 3	10 YR 5/ 2	10 YR 6/ 2	10 YR 5/ 2	7.5YR 4/ 4	10 YR 4/ 3	10 YR 5/ 2
TR anterior aspect of metaphysis	10 YR 5/ 3	10 YR 4/ 3	10 YR 5/ 2	10 YR 6/ 2	10 YR 6/ 2	10 YR 4/ 3	10 YR 4/ 3	7.5YR 6/ 3
TR anterior aspect of metaphysis	2.5Y 5/ 3	10 YR 3/ 3	2.5Y 4/ 1	7.5YR 7/ 2	10 YR 6/ 3	10 YR 4/ 4	7.5YR 4/ 3	10 YR 5/ 2
TR posterior aspect of metaphysis	7.5YR 3/ 2	7.5YR 2/ 3	7.5YR 4/ 3	10 YR 4/ 3	2.5Y 4/ 3	10 YR 5/ 4	10 YR 3/ 3	10 YR 4/ 3
TR posterior aspect of metaphysis	10 YR 4/ 2	10 YR 4/ 3	10 Y 8/ 1	2.5YR 7/ 2	7.5YR 6/ 3	10 YR 6/ 1	10 YR 6/ 2	2.5Y 8/ 1
TR posterior aspect of metaphysis	7.5YR 6/ 2	10 YR 5/ 3	7.5Y 9/ 1	7.5YR 7/ 2	10 YR 6/ 3	10 YR 5/ 2	10 YR 6/ 3	N 3.5
TR posterior aspect of metaphysis	7.5YR 5/ 3	10 YR 5/ 4	10 YR 5/ 4	7.5YR 7/ 2	7.5YR 4/ 3	10 YR 6/ 4	10 YR 6/ 2	N 4.0
TR medial malleolus dist epiphysis	7.5Y 4/ 1	7.5YR 4/ 4	7.5YR 4/ 3	10 YR 5/ 3	10 YR 4/ 3	7.5YR 4/ 2	7.5YR 5/ 4	10 YR 2/ 1
TR medial malleolus dist epiphysis	10 YR 3/ 4	10 YR 4/ 3	10 YR 4/ 1	10 YR 4/ 3	10 YR 5/ 3	2.5Y 4/ 3	2.5Y 3/ 3	10 YR 2/ 2
LEFT FIBULA								
FiL medial aspect of fibula	7.5YR 5/ 2	7.5YR 4/ 4	7.5YR 6/ 2	10 YR 7/ 2	7.5YR 4/ 3	N/A	10 YR 6/ 3	7.5YR 5/ 2

LEFT FIBULA (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
FiL medial aspect of fibula	5 YR 4/ 2	10 YR 2/ 2	2.5Y 4/ 1	2.5Y 7/ 1	2.5Y 3/ 1	10 YR 2/ 1	7.5YR 6/ 3	7.5YR 5/ 2
FiL medial aspect of fibula	7.5YR 5/ 3	10 YR 3/ 3	10 YR 5/ 2	5 Y 5/ 1	N 3.0	10 YR 2/ 1	7.5YR 7/ 4	10 YR 6/ 3
FiL medial aspect of fibula	7.5YR 3/ 3	7.5YR 3/ 3	7.5YR 3/ 1	10 YR 7/ 3	N/A	10 YR 5/ 4	10 YR 5/ 2	7.5YR 6/ 2
FiL lateral aspect of fibula	7.5YR 5/ 2	2.5Y 6/ 3	7.5YR 5/ 2	7.5YR 5/ 3	2.5Y 7/ 1	N/A	7.5YR 4/ 4	7.5YR 6/ 2
FiL lateral aspect of fibula	7.5YR 5/ 2	10 YR 5/ 4	10 YR 7/ 3	5 YR 7/ 2	N 4.0	N/A	7.5YR 4/ 4	7.5YR 6/ 2
FiL lateral aspect of fibula	7.5YR 5/ 3	10 YR 7/ 2	7.5YR 8/ 2	10 YR 6/ 2	5 BG 2/ 1	N 1.0	10 YR 6/ 3	N 5.5
FiL lateral aspect of fibula	7.5YR 6/ 2	10 YR 6/ 4	10 YR 5/ 2	5 YR 3/ 2	10 YR 6/ 3	10 YR 4/ 3	10 YR 4/ 2	10 YR 5/ 2
RIGHT FIBULA								
FiR medial aspect of fibula	7.5YR 3/ 3	10 YR 6/ 3	7.5YR 5/ 2	10 YR 6/ 3	10 YR 7/ 2	N 2.5	10 YR 4/ 3	5 YR 6/ 4
FiR medial aspect of fibula	7.5YR 4/ 2	10 YR 5/ 2	2.5Y 6/ 1	10 YR 7/ 2	10 YR 6/ 3	N/A	10 YR 5/ 3	10 YR 6/ 2
FiR medial aspect of fibula	5 YR 4/ 2	7.5YR 4/ 3	10 YR 6/ 2	10 YR 6/ 2	10 YR 6/ 3	5 YR 2/ 2	10 YR 4/ 3	N 3.0
FiR medial aspect of fibula	7.5YR 4/ 4	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 4/ 3	10 YR 5/ 3	10 YR 5/ 2	7.5YR 4/ 3	2.5Y 3/ 1
FiR lateral aspect of fibula	5 YR 2/ 2	7.5YR 4/ 3	10 YR 5/ 2	7.5YR 7/ 2	7.5YR 4/ 3	7.5Y 2/ 1	10 YR 7/ 1	10 YR 6/ 2
FiR lateral aspect of fibula	7.5YR 3/ 2	7.5YR 4/ 4	10 Y 8/ 1	2.5Y 7/ 1	10 YR 4/ 2	2.5Y 4/ 2	10 YR 7/ 2	2.5Y 5/ 1
FiR lateral aspect of fibula	7.5YR 4/ 2	7.5YR 3/ 2	2.5Y 5/ 1	5 Y 7/ 1	10 YR 4/ 2	7.5YR 5/ 3	7.5YR 5/ 3	10 YR 4/ 2
FiR lateral aspect of fibula	7.5YR 5/ 3	5 YR 3/ 2	10 YR 5/ 2	7.5YR 6/ 4	10 YR 2/ 1	N/A	10 YR 6/ 3	10 YR 3/ 1
LEFT ASTRAGALUS								
AL dorsal aspect	7.5YR 3/ 3	10 YR 6/ 2	10 YR 3/ 1	10 YR 3/ 2	10 YR 3/ 2	10 YR 3/ 3	10 YR 5/ 4	10 YR 6/ 3
AL dorsal aspect	10 YR 2/ 2	10 YR 5/ 2	5 YR 2/ 2	7.5YR 5/ 3	7.5YR 4/ 4	7.5YR 3/ 3	7.5YR 5/ 4	10 YR 6/ 3
AL dorsal aspect	10 YR 2/ 2	2.5Y 4/ 1	5 YR 2/ 2	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 5/ 4	2.5Y 5/ 2
AL plantar aspect	7.5YR 3/ 3	7.5YR 4/ 4	7.5YR 5/ 4	10 YR 2/ 1	10 YR 4/ 3	7.5YR 7/ 2	7.5YR 5/ 4	2.5Y 5/ 2
LEFT ASTRAGALUS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
AL plantar aspect	7.5YR 3/ 3	7.5YR 4/ 4	7.5YR 7/ 2	7.5YR 5/ 3	10 YR 6/ 3	10 YR 7/ 3	7.5YR 5/ 4	7.5YR 6/ 2
AL plantar aspect	7.5YR 3/ 3	10 YR 5/ 3	7.5YR 4/ 3	10 YR 6/ 2	10 YR 6/ 2	10 YR 5/ 4	7.5YR 4/ 3	7.5YR 5/ 2

RIGHT ASTRAGALUS	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
AR dorsal aspect	10 YR 4/ 4	10 YR 5/ 4	10 YR 6/ 2	7.5YR 5/ 3	7.5YR 5/ 3	2.5Y 5/ 3	10 YR 4/ 2	10 YR 5/ 4
AR dorsal aspect	7.5YR 2/ 3	10 YR 5/ 4	10 YR 5/ 2	5 YR 6/ 3	10 YR 6/ 3	10 YR 5/ 3	2.5Y 4/ 1	7.5YR 4/ 4
AR dorsal aspect	7.5YR 4/ 3	10 YR 5/ 4	10 YR 4/ 3	7.5YR 5/ 3	10 YR 5/ 3	10 YR 5/ 2	10 YR 3/ 4	10 YR 5/ 4
AR plantar aspect	7.5YR 3/ 3	10 YR 4/ 2	10 YR 5/ 2	7.5YR 5/ 3	10 YR 5/ 3	7.5YR 3/ 3	7.5YR 5/ 4	10 YR 4/ 2
AR plantar aspect	10 YR 3/ 3	10 YR 4/ 2	10 YR 7/ 2	10 YR 6/ 4	7.5YR 7/ 3	7.5YR 4/ 3	7.5YR 5/ 4	10 YR 6/ 2
AR plantar aspect	2.5Y 2/ 2	7.5YR 5/ 3	10 YR 6/ 2	10 YR 6/ 4	7.5YR 7/ 3	7.5YR 4/ 3	10 YR 4/ 3	10 YR 5/ 2
LEFT CALCANEI								
CL dorsal aspect	10 YR 5/ 2	10 YR 6/ 3	7.5YR 5/ 3	10 YR 5/ 2	10 YR 4/ 4	10 YR 6/ 3	10 YR 6/ 3	10 YR 6/ 2
CL dorsal aspect	7.5YR 2/ 3	10 YR 2/ 2	10 YR 4/ 3	10 YR 3/ 2	7.5YR 5/ 4	10 YR 2/ 2	2.5Y 3/ 3	2.5Y 4/ 1
CL dorsal aspect epiphysis	10 YR 5/ 2	5 Y 2/ 2	10 YR 3/ 2	2.5Y 7/ 2	2.5Y 2/ 2	2.5Y 5/ 3	2.5Y 3/ 3	10 YR 6/ 2
CL plantar aspect	7.5YR 6/ 3	7.5YR 2/ 3	10 YR 4/ 2	7.5YR 5/ 3	10 YR 4/ 3	10 YR 5/ 3	10 YR 8/ 3	10 YR 5/ 2
CL plantar aspect	7.5YR 4/ 3	10 YR 3/ 4	10 YR 6/ 6	7.5YR 4/ 3	10 YR 3/ 4	10 YR 7/ 3	7.5YR 6/ 4	2.5Y 8/ 3
CL plantar aspect epiphysis	10 YR 5/ 2	10 YR 4/ 3	2.5Y 6/ 2	10 YR 6/ 2	10 YR 5/ 4	10 YR 7/ 3	10 YR 5/ 4	10 YR 7/ 2
RIGHT CALCANEI								
CR dorsal aspect	7.5YR 3/ 2	10 YR 5/ 3	10 YR 5/ 2	7.5YR 6/ 3	7.5YR 4/ 4	N/A	7.5YR 4/ 3	10 YR 4/ 1
CR dorsal aspect	7.5YR 2/ 3	2.5Y 2/ 2	10 YR 3/ 2	10 YR 3/ 3	10 YR 3/ 3	10 YR 4/ 2	10 YR 2/ 2	10 YR 2/ 1
CR dorsal aspect epiphysis	7.5YR 5/ 2	5 Y 4/ 2	10 YR 4/ 2	7.5YR 5/ 3	10 YR 4/ 2	10 YR 3/ 2	10 YR 3/ 4	N 6.0
CR plantar aspect	7.5YR 5/ 2	10 YR 6/ 4	7.5YR 7/ 4	7.5YR 3/ 2	7.5YR 3/ 3	10 YR 6/ 3	10 YR 5/ 3	7.5YR 5/ 3
CR plantar aspect	10 YR 4/ 2	10 YR 4/ 3	10 YR 5/ 3	5 YR 2/ 2	10 YR 2/ 1	10 YR 2/ 2	10 YR 6/ 4	7.5YR 4/ 3
CR plantar aspect epiphysis	10 YR 5/ 2	10 YR 6/ 2	10 YR 5/ 2	7.5YR 2/ 3	10 YR 2/ 1	10 YR 7/ 3	10 YR 5/ 2	N 2.0
LEFT 3RD METATARSAL								
MT L3 dorsal aspect	10 YR 6/ 3	10 YR 6/ 2	10 YR 3/ 2	5 YR 3/ 2	2.5Y 3/ 1	7.5YR 3/ 3	10 YR 5/ 3	10 YR 5/ 2
MT L3 dorsal aspect	10 YR 5/ 4	10 YR 6/ 2	7.5YR 5/ 3	7.5YR 3/ 1	10 YR 6/ 4	10 YR 5/ 4	7.5YR 4/ 3	2.5Y 6/ 1
MT L3 dorsal aspect epiphysis	7.5YR 5/ 4	10 YR 5/ 2	10 YR 6/ 2	7.5YR 3/ 1	10 YR 3/ 2	7.5YR 4/ 3	10 YR 5/ 3	10 YR 6/ 3
MT L3 plantar aspect	2.5Y 2/ 2	7.5YR 3/ 3	2.5Y 4/ 2	2.5Y 5/ 4	10 YR 5/ 4	10 YR 5/ 4	7.5YR 3/ 3	2.5Y 3/ 1

LEFT 3RD METATARSAL (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
MT L3 plantar aspect	7.5YR 4/ 3	10 YR 3/ 3	7.5YR 6/ 6	7.5YR 5/ 2	10 YR 3/ 3	10 YR 6/ 3	7.5YR 4/ 3	7.5YR 5/ 3
MT L3 plantar aspect epiphysis	7.5YR 5/ 4	10 YR 4/ 3	7.5YR 4/ 3	7.5YR 5/ 3	7.5YR 3/ 3	2.5Y 5/ 1	7.5YR 4/ 4	10 YR 5/ 3
LEFT 4TH METATARSAL								
MT L4 dorsal aspect	10 YR 4/ 2	2.5Y 5/ 2	7.5YR 5/ 2	10 YR 6/ 3	10 YR 4/ 2	7.5YR 3/ 2	10 YR 7/ 3	10 YR 6/ 2
MT L4 dorsal aspect	7.5YR 5/ 4	7.5YR 7/ 2	7.5YR 4/ 3	7.5YR 5/ 3	7.5YR 7/ 3	7.5YR 4/ 4	10 YR 6/ 4	10 YR 8/ 3
MT L4 dorsal aspect	7.5YR 6/ 3	10 YR 6/ 2	7.5YR 6/ 3	7.5YR 4/ 2	10 YR 5/ 3	7.5YR 4/ 4	10 YR 5/ 4	7.5YR 6/ 4
MT L4 plantar aspect	10 YR 3/ 3	2.5Y 3/ 4	7.5YR 5/ 3	10 YR 6/ 3	10 YR 4/ 3	10 YR 4/ 3	10 YR 5/ 3	10 YR 6/ 3
MT L4 plantar aspect	7.5YR 4/ 3	10 YR 4/ 3	10 YR 7/ 4	5 Y 7/ 1	10 YR 5/ 4	7.5YR 5/ 3	7.5YR 5/ 3	10 YR 6/ 1
MT L4 plantar aspect	7.5YR 5/ 4	7.5YR 3/ 3	7.5YR 5/ 3	10 YR 4/ 2	7.5YR 3/ 2	7.5YR 5/ 2	10 YR 5/ 3	7.5YR 5/ 2
LEFT 2ND &5TH METATARSALS								
MT L2 dorsal aspect	10 YR 6/ 2	7.5YR 5/ 3	7.5YR 4/ 2	10 YR 6/ 3	10 YR 6/ 2	10 YR 2/ 2	10 YR 4/ 3	7.5YR 5/ 2
MT L2 dorsal aspect	10 YR 5/ 3	10 YR 4/ 2	10 YR 5/ 1	10 YR 7/ 3	10 YR 6/ 3	N 2.5	7.5YR 4/ 2	7.5YR 5/ 2
MT L2 plantar aspect	7.5YR 4/ 3	10 YR 4/ 3	10 YR 4/ 1	10 YR 4/ 3	10 YR 5/ 3	7.5YR 3/ 3	10 YR 6/ 2	10 YR 6/ 2
MT L2 plantar aspect	10 YR 4/ 3	10 YR 5/ 4	10 YR 5/ 2	10 YR 6/ 4	10 YR 6/ 3	7.5YR 4/ 3	10 YR 3/ 2	10 YR 6/ 2
MT L5 dorsal aspect	5 YR 3/ 2	10 YR 4/ 3	10 YR 6/ 3	5 YR 2/ 2	7.5YR 4/ 4	10 YR 3/ 2	10 YR 4/ 2	N/A
MT L5 dorsal aspect	7.5YR 5/ 3	10 YR 3/ 3	10 YR 7/ 4	7.5YR 3/ 1	7.5YR 5/ 4	2.5Y 3/ 1	10 YR 4/ 2	N/A
MT L5 plantar aspect	7.5YR 4/ 3	10 YR 6/ 3	7.5YR 4/ 2	10 YR 5/ 3	10 YR 6/ 4	10 YR 3/ 1	7.5YR 3/ 2	N/A
MT L5 plantar aspect	10 YR 5/ 2	2.5Y 5/ 2	7.5YR 4/ 3	7.5YR 3/ 2	7.5YR 4/ 4	10 YR 6/ 4	10 YR 5/ 3	N/A
RIGHT 3rd METATARSAL								
MT R3 dorsal aspect	10 YR 5/ 3	7.5YR 4/ 3	7.5YR 5/ 1	7.5YR 4/ 3	5 Y 6/ 2	10 YR 6/ 2	10 YR 6/ 4	N 3.5
MT R3dorsal aspect	10 YR 5/ 2	10 YR 3/ 4	10 YR 6/ 3	10 YR 5/ 3	5 Y 7/ 3	10 YR 6/ 2	10 YR 6/ 4	7.5YR 4/ 3
MT R3dorsal aspect epiphysis	7.5YR 4/ 4	7.5YR 3/ 3	7.5YR 3/ 2	7.5YR 4/ 4	10 YR 4/ 3	10 YR 2/ 1	10 YR 6/ 4	10 YR 2/ 1
MT R3plantar aspect	7.5YR 3/ 3	10 YR 3/ 3	10 YR 6/ 4	10 YR 8/ 3	2.5Y 5/ 3	10 YR 4/ 3	7.5YR 5/ 3	N 1.0
MT R3plantar aspect	7.5YR 2/ 3	10 YR 4/ 3	10 YR 6/ 6	10 YR 3/ 2	10 YR 5/ 4	10 YR 5/ 4	10 YR 5/ 3	10 YR 6/ 3
MT R3plantar aspect epiphysis	7.5YR 4/ 4	10 YR 4/ 2	10 YR 5/ 3	7.5YR 6/ 3	10 YR 5/ 4	7.5YR 5/ 4	10 YR 6/ 3	7.5YR 6/ 4

RIGHT 4TH METATARSAL	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
MT R4 dorsal aspect	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 5/ 2	7.5YR 3/ 2	7.5YR 5/ 3	10 YR 5/ 2	10 YR 5/ 4	10 YR 4/ 1
MT R4 dorsal aspect	10 YR 6/ 4	10 YR 5/ 4	7.5YR 5/ 2	7.5YR 3/ 2	10 YR 6/ 3	10 YR 7/ 3	10 YR 5/ 4	7.5YR 5/ 3
MT R4 dorsal aspect epiphysis	10 YR 5/ 3	10 YR 3/ 3	7.5YR 3/ 2	5 YR 2/ 2	10 YR 5/ 3	2.5Y 3/ 1	10 YR 5/ 4	7.5YR 3/ 2
MT R4 plantar aspect	2.5Y 3/ 1	10 YR 5/ 3	10 YR 6/ 2	7.5YR 7/ 2	7.5YR 3/ 3	10 YR 5/ 3	10 YR 5/ 4	N 4.5
MT R4 plantar aspect	7.5YR 4/ 4	10 YR 5/ 3	10 YR 6/ 4	10 YR 6/ 2	10 YR 4/ 3	10 YR 6/ 4	10 YR 4/ 2	7.5YR 5/ 3
MT R4 plantar aspect epiphysis	7.5YR 4/ 4	10 YR 5/ 4	7.5YR 5/ 4	10 YR 6/ 2	7.5YR 3/ 2	7.5YR 4/ 4	7.5YR 4/ 3	10 YR 4/ 2
RIGHT 2ND & 5TH METATARSAL								
MT R2 dorsal aspect	7.5YR 5/ 4	2.5Y 2/ 2	7.5YR 3/ 3	7.5YR 3/ 2	10 YR 2/ 1	7.5YR 3/ 2	10 YR 4/ 2	2.5Y 2/ 1
MT R2 dorsal aspect	7.5YR 4/ 3	7.5YR 3/ 2	2.5Y 4/ 1	7.5YR 3/ 2	2.5Y 3/ 1	7.5YR 4/ 4	10 YR 5/ 2	5 Y 2/ 2
MT R2 plantar aspect	7.5YR 5/ 6	5 YR 2/ 2	10 YR 5/ 2	7.5YR 3/ 3	10 YR 4/ 3	10 YR 4/ 3	10 YR 5/ 3	2.5GY 2/ 1
MT R2 plantar aspect	7.5YR 4/ 3	7.5YR 4/ 3	7.5YR 6/ 3	7.5YR 4/ 3	7.5YR 3/ 2	10 YR 6/ 3	2.5Y 6/ 3	N 2.0
MT R5 dorsal aspect	5 YR 3/ 3	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 6/ 3	7.5YR 4/ 3	10 YR 3/ 3	10 YR 4/ 2	10 YR 4/ 1
MT R5 dorsal aspect	5 YR 3/ 2	10 YR 4/ 3	10 YR 6/ 2	7.5YR 5/ 4	2.5Y 6/ 1	5 YR 2/ 2	10 YR 5/ 2	10 YR 4/ 2
MT R5 plantar aspect	7.5YR 4/ 3	2.5Y 4/ 3	10 YR 5/ 3	10 YR 4/ 3	7.5YR 4/ 3	7.5YR 4/ 4	7.5YR 4/ 2	5 Y 4/ 1
MT R5 plantar aspect	10 YR 3/ 2	10 YR 5/ 2	7.5YR 3/ 3	7.5YR 6/ 3	10 YR 4/ 3	7.5YR 5/ 4	10 YR 5/ 3	10 Y 3/ 3
LEFT INNOMINATE								
IL pubic symphysis	10 YR 5/ 2	10 YR 5/ 2	10 YR 5/ 2	10 YR 6/ 2	10 YR 2/ 1	7.5YR 6/ 3	2.5Y 6/ 3	10 YR 5/ 2
IL pubic symphysis	10 YR 5/ 3	10 YR 4/ 3	10 YR 4/ 2	10 YR 7/ 2	2.5Y 3/ 1	10 YR 6/ 3	10 YR 7/ 2	2.5Y 5/ 2
IL ischium medial aspect	7.5YR 4/ 2	10 YR 5/ 3	10 YR 5/ 1	10 YR 6/ 2	7.5YR 3/ 1	2.5Y 7/ 2	7.5YR 4/ 2	10 YR 4/ 2
IL ischium medial aspect	7.5YR 3/ 2	7.5YR 4/ 3	2.5Y 5/ 2	10 YR 5/ 2	10 YR 2/ 1	10 YR 5/ 2	7.5YR 4/ 3	5 YR 5/ 2
IL ischium medial aspect	7.5YR 5/ 2	10 YR 2/ 2	10 YR 4/ 2	10 YR 4/ 2	N 1.5	2.5Y 6/ 1	10 YR 5/ 1	5 YR 4/ 1
IL ischium lateral aspect	7.5YR 2/ 2	7.5YR 2/ 3	7.5YR 5/ 3	10 YR 7/ 2	N 2.0	7.5YR 3/ 2	7.5YR 6/ 3	10 YR 4/ 2
IL ischium lateral aspect	10 YR 3/ 2	10 YR 2/ 2	2.5Y 7/ 1	2.5Y 6/ 1	2.5Y 2/ 1	10 YR 3/ 2	10 YR 5/ 2	7.5YR 4/ 2
IL ischium lateral aspect	7.5YR 2/ 2	7.5YR 3/ 3	7.5YR 4/ 3	10 YR 5/ 2	N 1.5	7.5YR 3/ 3	7.5YR 6/ 3	10 YR 6/ 2
IL lesser sciatic notch	10 Y 4/ 1	5 YR 2/ 3	10 YR 3/ 2	2.5Y 4/ 1	7.5YR 2/ 1	10 YR 2/ 1	5 Y 2/ 2	10 YR 2/ 2

LEFT INNOMINATE (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
IL lesser sciatic notch	2.5Y 4/ 1	7.5YR 2/ 2	2.5Y 3/ 2	2.5Y 4/ 1	2.5Y 2/ 1	10 YR 3/ 3	10 YR 2/ 2	2.5Y 4/ 1
IL ischiatic spine	2.5Y 4/ 1	7.5YR 3/ 3	7.5YR 5/ 3	2.5Y 3/ 1	10 YR 3/ 3	7.5YR 3/ 2	10 YR 4/ 3	10 YR 4/ 1
IL ischiatic spine	10 YR 6/ 2	7.5YR 2/ 3	7.5YR 5/ 3	10 YR 5/ 2	10 YR 2/ 1	10 YR 3/ 2	10 YR 5/ 3	10 YR 4/ 3
IL auricular surface	7.5YR 6/ 2	10 YR 5/ 2	10 YR 6/ 2	10 YR 5/ 2	10 YR 5/ 2	5 YR 2/ 1	7.5YR 4/ 2	10 YR 4/ 3
IL auricular surface	7.5YR 3/ 3	10 YR 3/ 2	7.5YR 4/ 2	7.5YR 6/ 3	10 YR 4/ 2	10 YR 3/ 3	10 YR 4/ 2	7.5YR 4/ 4
IL auricular surface	7.5YR 5/ 3	10 YR 4/ 3	7.5YR 4/ 2	10 YR 6/ 2	10 YR 2/ 2	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 5/ 4
IL tuber sacrale	10 YR 4/ 2	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 4/ 3	N/A	10 YR 5/ 3	10 YR 4/ 2	10 YR 5/ 2
IL tuber coxae	7.5YR 4/ 3	7.5YR 2/ 3	10 YR 5/ 2	7.5YR 5/ 3	2.5Y 3/ 1	7.5YR 2/ 3	10 YR 4/ 3	7.5YR 6/ 4
IL crest of ilium	7.5YR 3/ 2	10 YR 3/ 2	5 YR 3/ 3	10 YR 5/ 4	N 2.0	N/A	7.5YR 3/ 1	10 YR 7/ 4
IL crest of ilium	7.5YR 4/ 2	7.5YR 3/ 2	5 YR 3/ 2	5 YR 4/ 3	10 YR 2/ 1	N/A	7.5YR 2/ 2	7.5YR 7/ 4
IL crest of ilium	7.5YR 4/ 4	7.5YR 4/ 3	10 YR 5/ 2	10 YR 6/ 4	N 2.0	N/A	10 YR 3/ 1	7.5YR 7/ 4
IL acetabulum	7.5YR 4/ 4	7.5YR 4/ 3	7.5YR 3/ 2	10 YR 3/ 3	7.5YR 2/ 1	7.5YR 2/ 3	10 YR 5/ 3	2.5Y 3/ 3
IL acetabulum	7.5YR 3/ 3	10 YR 5/ 3	10 YR 3/ 3	2.5Y 5/ 2	N 2.5	10 YR 3/ 4	10 YR 4/ 3	7.5YR 4/ 3
IL acetabulum	10 YR 3/ 3	2.5Y 3/ 2	10 YR 3/ 1	7.5YR 3/ 3	N 2.0	7.5YR 4/ 4	10 YR 5/ 4	7.5YR 4/ 4
IL greater sciatic notch	10 YR 5/ 2	2.5Y 2/ 2	10 YR 5/ 2	2.5Y 5/ 2	10 YR 2/ 1	10 YR 5/ 3	2.5Y 2/ 2	10 YR 4/ 2
IL greater sciatic notch	10 YR 4/ 2	7.5YR 2/ 1	2.5Y 4/ 1	2.5Y 5/ 3	2.5Y 2/ 1	2.5Y 4/ 2	7.5Y 2/ 2	10 YR 3/ 3
IL gluteal line	10 YR 3/ 2	7.5YR 2/ 3	10 YR 6/ 2	10 YR 7/ 3	N/A	7.5YR 6/ 3	7.5YR 6/ 4	10 YR 7/ 3
ILgluteal line	10 YR 4/ 2	7.5YR 2/ 2	10 YR 6/ 2	10 YR 6/ 2	N/A	10 YR 5/ 2	10 YR 6/ 2	10 YR 7/ 3
IL ilium lateral aspect	7.5YR 5/ 2	7.5YR 2/ 2	10 YR 4/ 2	2.5YR 5/ 1	10 YR 2/ 1	2.5Y 7/ 2	10 YR 6/ 2	10 YR 5/ 3
IL ilium lateral aspect	5 Y 6/ 1	10 YR 2/ 2	7.5YR 5/ 3	10 YR 7/ 4	7.5YR 3/ 1	10 YR 6/ 3	10 YR 6/ 2	10 YR 7/ 3
IL ilium lateral aspect	2.5Y 6/ 1	10 YR 2/ 2	7.5YR 5/ 3	7.5YR 7/ 3	7.5YR 2/ 1	7.5YR 4/ 4	10 YR 5/ 2	7.5YR 5/ 3
IL ilium medial aspect	10 YR 7/ 2	7.5YR 5/ 3	2.5Y 5/ 2	10 YR 4/ 2	N 2.0	7.5YR 3/ 2	10 YR 4/ 3	7.5YR 7/ 3
IL ilium medial aspect	10 YR 7/ 2	10 YR 3/ 2	10 YR 5/ 2	10 YR 6/ 3	10 YR 3/ 2	7.5YR 3/ 3	10 YR 7/ 2	10 YR 5/ 3
IL ilium medial aspect	10 YR 7/ 2	10 YR 6/ 2	N/A	10 YR 5/ 1	10 Y 2/ 1	7.5YR 3/ 2	2.5Y 5/ 1	10 YR 4/ 3

RIGHT INNOMINATE	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
IR pubic symphysis	7.5YR 5/ 3	10 YR 6/ 3	10 YR 6/ 2	10 YR 6/ 3	10 YR 2/ 1	10 YR 6/ 2	7.5YR 6/ 4	7.5YR 3/ 3
IR pubic symphysis	10 YR 3/ 3	10 YR 5/ 3	10 YR 6/ 3	10 YR 7/ 2	2.5Y 3/ 1	10 YR 7/ 2	10 YR 5/ 3	7.5YR 5/ 4
IR ischium medial aspect	10 YR 5/ 2	10 YR 5/ 3	5 YR 6/ 3	10 YR 6/ 3	N 1.5	10 YR 6/ 2	7.5YR 5/ 2	10 YR 5/ 1
IR ischium medial aspect	7.5YR 4/ 2	10 YR 5/ 4	5 YR 4/ 1	10 YR 6/ 2	10 YR 5/ 3	10 YR 4/ 2	10 YR 5/ 2	5 YR 4/ 1
IR ischium medial aspect	7.5YR 3/ 2	7.5YR 4/ 4	7.5YR 5/ 1	2.5Y 6/ 1	2.5Y 2/ 1	2.5Y 6/ 1	10 YR 3/ 2	7.5YR 4/ 2
IR ischium lateral aspect	10 YR 4/ 2	10 YR 3/ 3	10 YR 5/ 2	10 YR 5/ 2	10 YR 2/ 1	10 YR 6/ 2	10 YR 5/ 1	7.5YR 4/ 2
IR ischium lateral aspect	2.5Y 4/ 1	10 YR 3/ 3	10 YR 5/ 1	10 YR 4/ 2	7.5YR 4/ 2	10 YR 3/ 3	7.5YR 5/ 2	7.5YR 4/ 2
IR ischium lateral aspect	7.5YR 4/ 2	10 YR 3/ 3	7.5YR 4/ 2	10 YR 6/ 2	7.5YR 3/ 2	7.5YR 3/ 3	2.5Y 7/ 2	7.5YR 5/ 2
IR lessor sciatic notch	7.5YR 4/ 2	N 1.0	5 Y 4/ 1	10 YR 5/ 2	10 YR 5/ 3	10 YR 3/ 2	2.5Y 3/ 1	2.5Y 4/ 2
IR lessor sciatic notch	10 YR 4/ 1	10 YR 3/ 3	2.5Y 3/ 1	7.5YR 4/ 2	7.5YR 2/ 3	10 YR 4/ 2	7.5Y 3/ 1	7.5Y 3/ 2
IR ischiatic spine	10 YR 3/ 2	7.5YR 3/ 3	2.5Y 4/ 2	10 YR 3/ 2	N 1.5	10 YR 5/ 2	10 YR 3/ 2	10 YR 4/ 2
IR ischiatic spine	7.5YR 5/ 3	10 YR 3/ 3	10 YR 3/ 2	10 YR 5/ 3	7.5Y 2/ 2	7.5YR 6/ 2	10 YR 5/ 2	10 YR 4/ 2
IR auricular surface	7.5YR 3/ 3	10 YR 4/ 3	10 YR 5/ 2	2.5Y 7/ 4	10 YR 6/ 3	10 YR 3/ 3	10 YR 6/ 3	10 YR 5/ 2
IR auricular surface	7.5YR 3/ 3	10 YR 4/ 3	10 YR 4/ 2	10 YR 7/ 4	7.5YR 4/ 4	10 YR 4/ 3	10 YR 5/ 2	10 YR 6/ 2
IR auricular surface	7.5YR 3/ 2	7.5YR 3/ 3	10 YR 7/ 3	10 YR 7/ 3	2.5Y 2/ 1	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 4/ 3
IR tuber sacrale	7.5YR 3/ 2	10 YR 4/ 3	2.5Y 6/ 3	10 YR 7/ 2	N 1.5	N/A	10 YR 5/ 2	10 YR 4/ 2
IR tuber coxae	7.5YR 4/ 3	10 YR 4/ 3	7.5YR 7/ 4	10 YR 5/ 2	10 YR 6/ 2	10 YR 2/ 2	10 YR 5/ 3	5 YR 5/ 3
IR crest of ilium	7.5YR 4/ 2	7.5YR 4/ 3	10 YR 5/ 2	7.5YR 6/ 3	7.5YR 6/ 3	7.5YR 3/ 2	7.5YR 4/ 3	7.5YR 5/ 3
IR crest of ilium	7.5YR 4/ 3	10 YR 4/ 3	10 YR 5/ 3	10 YR 6/ 2	5 Y 3/ 1	N 2.0	10 YR 5/ 2	7.5YR 5/ 3
IR crest of ilium	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 6/ 4	10 YR 6/ 3	10 YR 3/ 1	N 1.5	10 YR 6/ 2	7.5YR 6/ 3
IR acetabulum	5 YR 2/ 3	2.5Y 5/ 2	10 YR 2/ 2	10 YR 5/ 2	10 YR 6/ 2	10 YR 3/ 3	10 YR 4/ 2	10 YR 3/ 2
IR acetabulum	7.5YR 3/ 3	10 YR 6/ 2	7.5YR 2/ 3	10 YR 3/ 2	10 YR 2/ 1	7.5YR 4/ 4	10 YR 5/ 2	7.5YR 4/ 3
IR acetabulum	7.5YR 3/ 2	10 YR 5/ 3	N/A	7.5YR 3/ 3	N 2.0	7.5YR 3/ 2	10 YR 5/ 2	10 YR 4/ 2
IR greater sciatic notch	2.5Y 5/ 2	10 YR 3/ 4	7.5YR 2/ 2	10 YR 4/ 2	2.5Y 2/ 1	10 YR 5/ 2	10 YR 2/ 1	2.5Y 4/ 2
IR greater sciatic notch	10 YR 3/ 2	5 Y 2/ 2	N/A	7.5YR 2/ 1	N 1.0	10 YR 4/ 2	5 Y 3/ 1	5 YR 5/ 3

RIGHT INNOMINATE (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
IR gluteal line	5 YR 3/ 3	7.5YR 3/ 3	7.5YR 5/ 2	7.5YR 6/ 2	10 YR 3/ 2	7.5YR 6/ 2	10 YR 6/ 2	7.5YR 6/ 2
IR gluteal line	7.5YR 3/ 3	7.5YR 3/ 3	5 YR 5/ 2	7.5YR 6/ 2	7.5YR 2/ 2	5 YR 6/ 3	2.5Y 6/ 1	7.5YR 5/ 3
IR ilium lateral aspect	7.5YR 3/ 3	7.5YR 3/ 3	7.5YR 5/ 2	5 YR 6/ 2	7.5YR 4/ 1	10 YR 7/ 2	10 YR 6/ 2	10 YR 6/ 2
IR ilium lateral aspect	10 YR 3/ 2	7.5YR 3/ 3	7.5YR 4/ 2	7.5YR 6/ 1	7.5YR 3/ 2	7.5YR 6/ 3	2.5Y 6/ 2	10 YR 5/ 2
IR ilium lateral aspect	10 YR 3/ 1	7.5YR 2/ 3	10 YR 4/ 2	7.5YR 6/ 1	7.5YR 3/ 2	10 YR 5/ 3	10 Y 7/ 1	2.5Y 6/ 1
IR ilium medial aspect	10 YR 5/ 2	10 YR 5/ 3	10 YR 6/ 2	2.5Y 6/ 2	7.5YR 4/ 3	10 YR 3/ 3	7.5YR 6/ 4	10 YR 7/ 2
IR ilium medial aspect	10 YR 4/ 2	2.5Y 4/ 3	2.5Y 6/ 1	10 YR 7/ 2	7.5YR 7/ 2	7.5YR 3/ 3	5 Y 6/ 1	10 YR 5/ 2
IR ilium medial aspect	2.5Y 4/ 2	10 YR 4/ 2	N/A	7.5YR 5/ 2	5 YR 7/ 2	7.5YR 3/ 3	10 YR 5/ 2	10 YR 7/ 2
LUMBAR REGION								
L7 L dorsal aspect of transverse process	7.5YR 7/ 1	N/A	N/A	10 YR 6/ 2	N/A	N/A	10 YR 4/ 3	N/A
L7 L ventral aspect of transverse process	7.5YR 4/ 2	N/A	N/A	2.5Y 6/ 1	N/A	N/A	2.5Y 5/ 3	N/A
L7 L mammillary process	7.5YR 5/ 3	N/A	N/A	10 YR 7/ 3	10 YR 3/ 1	N/A	2.5Y 5/ 2	N/A
L7 L lateral aspect of spinous process	10 YR 2/ 2	N/A	N/A	10 YR 7/ 3	5 G 3/ 3	N/A	7.5YR 4/ 3	N/A
L7 R lateral aspect of spinous process	2.5Y 2/ 1	N/A	N/A	10 YR 5/ 3	N 2.5	N/A	2.5Y 3/ 2	N/A
L7 R mammillary process	7.5YR 4/ 3	N/A	N/A	10 YR 7/ 2	2.5Y 4/ 1	N/A	2.5Y 6/ 1	N/A
L7 R dorsal aspect of transverse process	10 YR 5/ 2	N/A	N/A	5 YR 4/ 2	N/A	N/A	10 YR 5/ 2	N/A
L7 R ventral aspect of transverse process	10 YR 5/ 3	N/A	N/A	10 YR 8/ 1	N/A	N/A	2.5Y 5/ 2	N/A
L6 L dorsal aspect of transverse process	10 YR 6/ 1	10 YR 5/ 2	10 YR 8/ 2	5 YR 7/ 2	N/A	N/A	10 YR 6/ 3	7.5YR 7/ 2
L6 L ventral aspect of transverse process	10 YR 5/ 2	10 YR 4/ 2	7.5YR 5/ 2	7.5YR 6/ 1	N/A	N/A	5 Y 5/ 2	10 YR 6/ 3
L6 L mammillary process	10 YR 5/ 2	10 YR 5/ 3	10 YR 7/ 2	2.5Y 6/ 3	7.5R 2/ 1	N/A	10 YR 6/ 4	10 YR 7/ 3
L6 L lateral aspect of spinous process	10 YR 3/ 2	7.5YR 4/ 3	10 YR 5/ 2	10 YR 5/ 4	N 2.0	N/A	10 YR 5/ 2	7.5YR 3/ 3
L6 R lateral aspect of spinous process	7.5YR 3/ 2	7.5Y 4/ 1	10 YR 4/ 2	10 YR 5/ 4	2.5Y 2/ 1	N/A	10 YR 4/ 2	10 YR 6/ 2
L6 R mammillary process	7.5YR 4/ 3	7.5YR 4/ 3	7.5YR 5/ 3	7.5YR 7/ 3	10 YR 3/ 2	N/A	7.5YR 6/ 3	2.5Y 5/ 2
L6 R dorsal aspect of transverse process	7.5YR 4/ 3	7.5YR 3/ 3	5 YR 5/ 1	2.5YR 6/ 2	N/A	10 YR 5/ 3	7.5YR 5/ 3	2.5Y 7/ 1
L6 R ventral aspect of transverse process	10 YR 5/ 2	5 Y 5/ 1	2.5Y 6/ 1	N 8.5	N/A	7.5YR 3/ 2	10 YR 6/ 2	10 YR 5/ 2

LUMBAR REGION (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
L5 L dorsal aspect of transverse process	7.5YR 6/ 2	7.5YR 4/ 4	10 YR 6/ 2	7.5YR 6/ 2	N/A	N/A	10 YR 7/ 3	7.5YR 7/ 2
L5 L ventral aspect of transverse process	10 YR 6/ 2	2.5Y 3/ 4	7.5YR 4/ 2	2.5Y 3/ 2	N/A	N/A	2.5Y 5/ 3	10 YR 5/ 2
L5 L mammilary process	7.5YR 4/ 3	7.5YR 3/ 2	7.5YR 6/ 3	7.5YR 6/ 3	N/A	N/A	10 YR 5/ 4	7.5YR 7/ 3
L5 L lateral aspect of spinous process	10 YR 4/ 2	10 YR 4/ 2	10 YR 6/ 3	7.5YR 5/ 4	7.5YR 3/ 3	N/A	10 YR 5/ 2	7.5YR 4/ 2
L5 R lateral aspect of spinous process	2.5Y 6/ 1	10 YR 3/ 3	10 YR 5/ 2	2.5Y 5/ 2	10 YR 3/ 2	N/A	2.5Y 5/ 2	7.5YR 7/ 2
L5 R mammilary process	7.5YR 4/ 3	7.5YR 3/ 2	10 YR 4/ 2	7.5YR 6/ 3	10 YR 7/ 2	N/A	2.5Y 6/ 2	7.5YR 5/ 3
L5 R dorsal aspect of transverse process	7.5YR 6/ 3	7.5YR 3/ 3	5 YR 5/ 2	7.5YR 6/ 2	5 Y 7/ 1	7.5YR 6/ 2	10 YR 6/ 2	7.5YR 7/ 2
L5 R ventral aspect of transverse process	10 YR 5/ 2	10 YR 5/ 3	2.5Y 4/ 1	7.5YR 5/ 3	10 YR 4/ 2	7.5GY 2/ 1	10 YR 5/ 2	2.5Y 4/ 1
L4 L dorsal aspect of transverse process	7.5YR 6/ 2	7.5YR 3/ 2	7.5YR 7/ 2	5 YR 6/ 3	N/A	N/A	10 YR 6/ 2	7.5YR 7/ 2
L4 L ventral aspect of transverse process	2.5Y 6/ 1	7.5YR 2/ 3	7.5YR 5/ 2	5 YR 5/ 1	N/A	N/A	10 YR 4/ 3	10 YR 4/ 2
L4 L mammilary process	10 YR 4/ 3	7.5YR 3/ 2	10 YR 7/ 3	7.5YR 7/ 4	N/A	N/A	10 YR 5/ 4	7.5YR 7/ 3
L4 L lateral aspect of spinous process	10 YR 4/ 2	10 YR 5/ 2	7.5YR 6/ 2	7.5YR 4/ 3	5 YR 2/ 1	N/A	7.5YR 5/ 3	7.5YR 4/ 2
L4 R lateral aspect of spinous process	10 YR 6/ 2	7.5YR 2/ 3	10 YR 5/ 1	7.5YR 5/ 4	10 YR 4/ 2	N/A	10 YR 4/ 2	5 Y 5/ 1
L4 R mammilary process	7.5YR 5/ 3	10 YR 4/ 2	10 YR 5/ 3	10 YR 8/ 3	10 YR 5/ 2	2.5Y 2/ 1	10 YR 5/ 3	7.5YR 5/ 3
L4 R dorsal aspect of transverse process	7.5YR 6/ 2	7.5YR 4/ 3	5 Y 6/ 1	10 YR 7/ 3	10 YR 8/ 2	10 YR 3/ 1	10 YR 6/ 3	7.5YR 6/ 3
L4 R ventral aspect of transverse process	10 YR 6/ 2	7.5Y 5/ 6	7.5YR 5/ 1	10 YR 6/ 2	10 YR 3/ 4	2.5Y 2/ 1	2.5Y 6/ 2	10 YR 5/ 2
L3 L dorsal aspect of transverse process	5 Y 7/ 1	7.5YR 3/ 2	7.5YR 5/ 3	7.5YR 7/ 3	N/A	N/A	10 YR 4/ 2	7.5YR 7/ 2
L3 L ventral aspect of transverse process	10 YR 5/ 2	7.5YR 3/ 2	7.5YR 4/ 3	7.5YR 6/ 3	N/A	N/A	10 YR 5/ 3	7.5YR 6/ 2
L3 L mammilary process	10 YR 5/ 3	7.5YR 3/ 3	10 YR 6/ 2	7.5YR 6/ 3	N/A	N/A	2.5GY 3/ 3	7.5YR 7/ 3
L3 L lateral aspect of spinous process	10 YR 4/ 2	10 YR 5/ 2	10 YR 6/ 2	5 YR 4/ 4	10 YR 4/ 3	N/A	10 YR 5/ 2	7.5YR 4/ 2
L3 R lateral aspect of spinous process	2.5Y 4/ 1	10 YR 4/ 3	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 5/ 2	N/A	2.5Y 6/ 1	10 YR 5/ 2
L3 R mammilary process	7.5YR 4/ 2	7.5YR 3/ 2	2.5Y 5/ 2	7.5YR 5/ 3	10 YR 5/ 2	N/A	7.5YR 5/ 3	2.5Y 5/ 2
L3 R dorsal aspect of transverse process	5 YR 4/ 3	10 YR 3/ 3	10 YR 6/ 2	10 YR 7/ 3	10 YR 6/ 2	2.5P 3/ 1	10 YR 6/ 2	5 YR 5/ 3
L3 R ventral aspect of transverse process	2.5Y 6/ 1	2.5Y 5/ 2	7.5YR 5/ 2	10 YR 5/ 2	10 YR 5/ 2	7.5BG 3/ 4	2.5Y 5/ 3	10 YR 5/ 2
L2 L dorsal aspect of transverse process	5 Y 4/ 1	10 YR 4/ 3	N/A	7.5YR 5/ 6	N/A	10 YR 3/ 1	2.5Y 6/ 1	7.5YR 6/ 2

LUMBAR REGION (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
L2 L ventral aspect of transverse process	10 YR 4/ 1	10 Y 5/ 1	N/A	7.5YR 3/ 3	N/A	N 3.0	10 YR 6/ 2	2.5Y 6/ 1
L2 L mammillary process	10 YR 5/ 3	10 YR 4/ 3	5 YR 4/ 3	7.5YR 5/ 4	7.5Y 5/ 2	N 4.0	10 YR 5/ 2	10 YR 6/ 3
L2 L lateral aspect of spinous process	2.5Y 5/ 2	7.5YR 5/ 3	10 YR 7/ 3	10 YR 5/ 3	2.5Y 3/ 2	N 2.5	10 YR 4/ 2	7.5YR 4/ 2
L2 R lateral aspect of spinous process	7.5YR 5/ 2	10 YR 2/ 2	2.5Y 6/ 1	10 YR 5/ 2	10 YR 5/ 2	N 1.5	10 YR 5/ 2	10 YR 5/ 2
L2 R mammillary process	5 YR 3/ 3	7.5YR 4/ 2	10 YR 5/ 2	7.5YR 6/ 3	10 YR 5/ 2	N/A	2.5Y 6/ 1	7.5YR 4/ 3
L2 R dorsal aspect of transverse process	2.5Y 3/ 2	7.5YR 3/ 2	N/A	7.5YR 8/ 2	7.5YR 6/ 3	7.5YR 2/ 1	2.5Y 7/ 3	10 YR 5/ 2
L2 R ventral aspect of transverse process	10 YR 5/ 2	10 YR 4/ 2	N/A	7.5YR 5/ 3	10 R 5/ 2	5P 2/1	2.5Y 6/ 2	2.5Y 7/ 2
L1 L dorsal aspect of transverse process	N/A	10 YR 4/ 2	2.5Y 4/ 2	2.5Y 4/ 3	N/A	N/A	10 YR 4/ 2	10 YR 4/ 2
L1 L ventral aspect of transverse process	N/A	2.5Y 5/ 1	10 YR 5/ 2	10 YR 6/ 4	N/A	N/A	10 YR 6/ 3	10 YR 7/ 2
L1 L mammillary process	10 YR 6/ 3	10 YR 5/ 2	7.5YR 5/ 3	7.5YR 5/ 6	7.5YR 4/ 2	N/A	10 YR 6/ 3	7.5YR 5/ 3
L1 L lateral aspect of spinous process	10 YR 5/ 2	7.5YR 6/ 4	10 YR 7/ 2	7.5YR 4/ 3	7.5YR 5/ 3	10 Y 3/ 1	10 YR 4/ 2	7.5YR 4/ 4
L1 R lateral aspect of spinous process	7.5YR 7/ 1	7.5YR 3/ 3	2.5Y 6/ 2	5 YR 4/ 3	10 Y 4/ 2	2.5G 2/ 1	10 YR 4/ 2	10 YR 5/ 3
L1 R mammillary process	10 YR 6/ 2	7.5YR 3/ 3	7.5YR 4/ 2	10 YR 6/ 2	5 Y 7/ 2	5 YR 3/ 1	10 YR 5/ 3	7.5YR 6/ 3
L1 R dorsal aspect of transverse process	N/A	7.5YR 3/ 3	N 2.5	7.5YR 5/ 2	5 Y 3/ 3	N 2.0	7.5YR 2/ 2	10 YR 5/ 2
L1 R ventral aspect of transverse process	N/A	10 YR 4/ 2	2.5BG 5/ 1	10 YR 4/ 2	7.5Y 4/ 2	N 3.0	7.5YR 5/ 2	2.5Y 5/ 2
THORACIC Region								
T15 L articular process/cavity for rib head	7.5YR 6/ 2	2.5Y 5/ 1	10 YR 5/ 2	5 YR 5/ 4	N/A	2.5Y 3/ 1	2.5Y 4/ 2	7.5YR 6/ 3
T15 L lateral aspect of spinous process	10 YR 5/ 1	10 YR 6/ 3	7.5YR 5/ 3	7.5YR 5/ 6	N/A	N 2.5	10 YR 5/ 3	7.5YR 4/ 3
T15 R lateral aspect of spinous process	7.5Y 2/ 2	10 YR 3/ 2	2.5Y 6/ 1	5 YR 4/ 4	N/A	N 2.0	7.5YR 5/ 3	7.5YR 6/ 4
T15 R articular process/cavity for rib head	10 YR 5/ 3	7.5YR 4/ 3	10 YR 6/ 2	10 YR 5/ 2	N/A	N 4.0	2.5Y 3/ 2	10 YR 4/ 3
T14 L articular process/cavity for rib head	10 YR 6/ 3	2.5Y 5/ 2	2.5Y 6/ 2	10 YR 3/ 3	7.5YR 4/ 3	N 2.5	7.5YR 4/ 3	7.5YR 7/ 4
T14 L lateral aspect of spinous process	7.5YR 5/ 2	7.5YR 5/ 3	10 YR 5/ 2	7.5YR 4/ 4	10 YR 6/ 2	N 2.5	7.5YR 4/ 2	5 YR 4/ 3
T14 R lateral aspect of spinous process	7.5YR 5/ 2	10 YR 3/ 3	2.5Y 6/ 1	7.5YR 3/ 3	10 YR 5/ 2	N 2.0	7.5YR 2/ 2	7.5YR 6/ 3
T14 R articular process/cavity for rib heaD	7.5YR 6/ 2	7.5YR 3/ 2	10 YR 4/ 2	7.5YR 4/ 2	10 YR 5/ 2	2.5Y 2/ 1	7.5YR 3/ 3	10 YR 5/ 3
T13 L articular process/cavity for rib head	10 YR 6/ 2	2.5Y 5/ 2	10 YR 5/ 2	7.5YR 5/ 4	7.5YR 6/ 3	2.5Y 2/ 1	10 YR 4/ 3	10 YR 6/ 4

THORACIC REGION (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
T13 L lateral aspect of spinous process	7.5YR 6/ 2	10 YR 5/ 3	7.5YR 4/ 3	7.5YR 4/ 4	7.5YR 5/ 3	10 YR 3/ 1	7.5YR 5/ 1	10 YR 6/ 2
T13 R lateral aspect of spinous process	2.5Y 6/ 1	10 YR 3/ 2	10 YR 5/ 2	5 YR 4/ 4	10 YR 4/ 1	N 3.0	2.5Y 4/ 2	10 YR 5/ 2
T13 R articular process/cavity for rib head	10 YR 5/ 2	10 YR 3/ 2	10 YR 5/ 3	10 YR 5/ 2	10 YR 6/ 2	N 2.0	7.5YR 3/ 3	7.5YR 5/ 3
T12 L articular process/cavity for rib head	7.5YR 4/ 3	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 5/ 4	10 YR 4/ 2	N/A	7.5YR 4/ 2	7.5YR 4/ 4
T12 L lateral aspect of spinous process	5 YR 3/ 3	7.5YR 3/ 3	7.5YR 4/ 3	7.5YR 5/ 4	10 YR 5/ 2	10 YR 3/ 1	7.5YR 5/ 2	7.5YR 4/ 3
T12 R lateral aspect of spinous process	10 YR 6/ 2	7.5YR 3/ 1	10 YR 5/ 2	10 YR 3/ 3	5 Y 6/ 1	N 3.5	10 YR 4/ 2	2.5Y 4/ 2
T12 R articular process/cavity for rib head	10 YR 4/ 2	2.5YR 2/ 2	10 YR 4/ 2	7.5YR 4/ 3	10 YR 5/ 2	10 YR 2/ 1	7.5YR 4/ 3	7.5YR 4/ 3
T11 L articular process/cavity for rib head	7.5YR 4/ 3	5 YR 4/ 2	7.5YR 5/ 3	7.5YR 5/ 6	5 YR 6/ 3	10 YR 3/ 1	10 YR 6/ 2	10 YR 5/ 3
T11 L lateral aspect of spinous process	10 YR 5/ 2	10 YR 5/ 3	10 YR 5/ 2	7.5YR 5/ 4	10 YR 5/ 2	7.5YR 4/ 1	7.5YR 5/ 2	10 YR 5/ 2
T11 R lateral aspect of spinous process	2.5Y 6/ 1	7.5YR 3/ 2	2.5Y 6/ 1	7.5YR 4/ 4	2.5Y 6/ 1	N 4.0	10 YR 5/ 2	10 YR 6/ 2
T11 R articular process/cavity for rib head	2.5Y 6/ 1	7.5YR 3/ 1	7.5YR 3/ 2	7.5YR 3/ 2	10 YR 5/ 2	N/A	7.5YR 3/ 3	10 YR 5/ 2
T10 L articular process/cavity for rib head	7.5YR 5/ 3	5 GY 5/ 1	10 YR 4/ 2	10 YR 4/ 4	10 YR 4/ 2	N 3.5	10 YR 5/ 3	7.5YR 5/ 4
T10 L lateral aspect of spinous process	2.5Y 5/ 2	————	7.5YR 4/ 1	7.5YR 6/ 3	10 YR 6/ 2	N 3.0	7.5YR 4/ 2	7.5YR 4/ 3
T10 R lateral aspect of spinous process	7.5YR 5/ 2	7.5YR 4/ 3	7.5YR 7/ 1	7.5YR 4/ 4	5 Y 6/ 1	2.5Y 2/ 1	10 YR 5/ 2	10 YR 5/ 2
T10 R articular process/cavity for rib head	7.5YR 7/ 2	7.5YR 4/ 2	10 YR 5/ 3	10 YR 4/ 3	7.5YR 4/ 2	N/A	7.5YR 4/ 3	10 YR 4/ 2
T9 L articular process/cavity for rib head	7.5YR 5/ 3	10 YR 3/ 2	10 YR 4/ 2	10 YR 3/ 3	10 YR 5/ 2	10 YR 3/ 1	10 YR 5/ 2	7.5YR 5/ 4
T9 L lateral aspect of spinous process	10 YR 6/ 3	5 YR 5/ 3	7.5YR 5/ 2	7.5YR 5/ 3	7.5YR 5/ 3	N 4.0	7.5YR 6/ 1	5 YR 4/ 3
T9 R lateral aspect of spinous process	7.5YR 6/ 3	10 YR 5/ 2	7.5YR 6/ 2	7.5YR 5/ 3	2.5Y 4/ 2	10 YR 2/ 1	5 Y 5/ 1	5 YR 4/ 2
T9 R articular process/cavity for rib head	10 YR 5/ 3	5 Y 7/ 1	10 YR 6/ 4	2.5Y 4/ 2	10 YR 4/ 2	N/A	10 YR 4/ 1	7.5YR 3/ 2
T8 L articular process/cavity for rib head	7.5YR 3/ 2	10 YR 4/ 2	2.5Y 5/ 2	10 YR 4/ 3	10 YR 5/ 2	N 4.5	10 YR 4/ 2	10 YR 4/ 3
T8 L lateral aspect of spinous process	10 YR 6/ 2	10 YR 3/ 2	7.5YR 5/ 2	7.5YR 5/ 3	7.5YR 6/ 2	N 3.5	10 YR 5/ 2	10 YR 3/ 2
T8 L lateral aspect of spinous process	10 YR 7/ 2	7.5YR 3/ 2	7.5YR 6/ 1	7.5YR 4/ 3	10 YR 5/ 2	5 YR 3/ 1	7.5YR 5/ 2	7.5YR 5/ 3
T8 R lateral aspect of spinous process	2.5GY 5/ 1	2.5Y 8/ 1	10 YR 6/ 2	7.5YR 6/ 2	7.5YR 6/ 1	N 3.5	2.5Y 5/ 1	10 YR 4/ 2
T8 R lateral aspect of spinous process	7.5YR 6/ 2	10 YR 5/ 1	5 YR 5/ 1	7.5YR 4/ 3	10 YR 4/ 2	N 2.0	7.5YR 5/ 1	10 YR 3/ 2
T8 R articular process/cavity for rib head	10 YR 6/ 4	7.5YR 7/ 2	10 YR 6/ 4	7.5YR 5/ 3	10 YR 5/ 2	10 YR 2/ 1	10 YR 6/ 2	7.5YR 4/ 2

THORACIC REGION (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
T7 L articular process/cavity for rib head	10 YR 5/ 2	5 Y 5/ 2	7.5YR 4/ 2	7.5YR 4/ 3	10 YR 5/ 3	10 YR 3/ 1	2.5Y 5/ 2	10 YR 5/ 3
T7 L lateral aspect of spinous process	7.5YR 5/ 2	7.5YR 4/ 2	2.5Y 6/ 1	10 YR 5/ 2	7.5YR 6/ 3	N 4.5	7.5YR 4/ 2	7.5YR 5/ 3
T7 L lateral aspect of spinous process	7.5YR 5/ 3	10 YR 5/ 1	7.5YR 6/ 2	7.5YR 5/ 3	10 YR 5/ 2	N 5.0	7.5YR 5/ 2	7.5YR 5/ 3
T7 R lateral aspect of spinous process	7.5YR 5/ 2	10 YR 6/ 1	7.5YR 6/ 2	7.5YR 6/ 2	5 Y 7/ 1	2.5G 2/ 1	10 YR 5/ 1	10 YR 4/ 2
T7 R lateral aspect of spinous process	10 YR 5/ 2	2.5Y 4/ 1	2.5Y 6/ 1	7.5YR 4/ 3	7.5YR 5/ 2	N 2.5	7.5YR 5/ 1	7.5YR 3/ 2
T7 R articular process/cavity for rib head	10 YR 5/ 3	7.5YR 6/ 2	7.5YR 6/ 4	10 YR 5/ 2	7.5YR 3/ 2	10 YR 2/ 1	10 YR 5/ 2	7.5YR 3/ 2
T6 L articular process/cavity for rib head	7.5YR 4/ 4	10 YR 4/ 3	10 YR 5/ 2	7.5YR 4/ 3	2.5Y 6/ 3	7.5Y 2/ 1	7.5YR 5/ 3	10 YR 5/ 3
T6 L lateral aspect of spinous process	10 YR 5/ 2	10 YR 3/ 3	5 YR 4/ 2	10 YR 4/ 2	10 YR 6/ 2	7.5Y 2/ 1	10 YR 6/ 2	7.5YR 5/ 3
T6 L lateral aspect of spinous process	7.5YR 6/ 2	10 YR 4/ 2	5 YR 6/ 2	7.5YR 6/ 4	10 YR 5/ 1	7.5YR 2/ 1	7.5YR 6/ 3	10 YR 5/ 2
T6 R lateral aspect of spinous process	7.5YR 7/ 2	2.5Y 5/ 2	10 YR 6/ 1	10 YR 5/ 2	2.5Y 6/ 2	5 Y 2/ 1	7.5YR 6/ 2	10 YR 4/ 2
T6 R lateral aspect of spinous process	5 Y 6/ 1	10 YR 5/ 1	7.5YR 5/ 2	10 YR 4/ 3	10 YR 4/ 2	N 2.0	2.5Y 6/ 1	7.5YR 4/ 3
T6 R articular process/cavity for rib head	10 YR 6/ 3	2.5Y 6/ 2	10 YR 5/ 3	10 YR 5/ 3	10 YR 4/ 2	2.5Y 2/ 1	10 YR 4/ 2	10 YR 4/ 2
T5 L articular process/cavity for rib head	10 YR 5/ 2	10 YR 6/ 2	10 YR 5/ 2	7.5YR 4/ 3	10 YR 6/ 2	10 YR 3/ 1	7.5YR 5/ 3	7.5YR 5/ 4
T5 L lateral aspect of spinous process	10 YR 6/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 5/ 2	7.5YR 5/ 3	7.5YR 2/ 1	10 YR 4/ 2	10 YR 4/ 2
T5 L lateral aspect of spinous process	7.5YR 7/ 2	10 YR 5/ 2	7.5YR 6/ 1	7.5YR 5/ 4	10 YR 6/ 2	10 Y 3/ 4	10 YR 5/ 1	5 YR 4/ 2
T5 R lateral aspect of spinous process	10 YR 5/ 3	7.5YR 4/ 2	5 Y 7/ 1	10 YR 4/ 3	10 YR 6/ 3	N 2.0	7.5YR 6/ 2	7.5YR 6/ 3
T5 R lateral aspect of spinous process	10 YR 4/ 2	10 YR 5/ 2	5 Y 6/ 1	10 YR 4/ 2	7.5YR 4/ 3	N 1.5	10 YR 4/ 2	7.5YR 4/ 3
T5 R articular process/cavity for rib head	7.5YR 7/ 2	7.5YR 7/ 2	10 YR 6/ 3	7.5YR 4/ 3	10 YR 3/ 2	N 1.5	7.5YR 4/ 3	5 Y 5/ 2
T4 L articular process/cavity for rib head	7.5YR 6/ 3	2.5Y 6/ 3	10 YR 4/ 2	10 YR 5/ 3	10 YR 6/ 2	N 3.0	10 YR 6/ 3	7.5YR 4/ 4
T4 L lateral aspect of spinous process	10 YR 4/ 2	10 YR 4/ 3	5 YR 5/ 3	7.5YR 4/ 3	7.5YR 6/ 2	7.5YR 2/ 1	10 YR 6/ 2	10 YR 5/ 2
T4 L lateral aspect of spinous process	7.5YR 5/ 2	10 YR 6/ 2	10 YR 5/ 1	10 YR 6/ 2	10 YR 5/ 2	N 2.0	7.5YR 4/ 3	7.5YR 6/ 3
T4 R lateral aspect of spinous process	7.5YR 5/ 2	10 YR 6/ 2	10 YR 7/ 1	10 YR 3/ 3	7.5YR 5/ 2	N 1.5	7.5YR 5/ 2	10 YR 6/ 2
T4 R lateral aspect of spinous process	10 YR 4/ 2	10 YR 5/ 1	10 YR 4/ 2	7.5YR 4/ 2	7.5YR 4/ 3	N 2.5	7.5YR 5/ 3	2.5Y 4/ 1
T4 R articular process/cavity for rib head	2.5Y 5/ 2	10 YR 6/ 2	7.5YR 4/ 3	7.5YR 5/ 3	7.5YR 5/ 3	2.5Y 2/ 1	10 YR 5/ 4	7.5YR 5/ 3
T3 L articular process/cavity for rib head	10 YR 5/ 2	10 YR 6/ 3	10 YR 6/ 2	7.5YR 5/ 3	7.5YR 5/ 2	10 YR 3/ 1	10 YR 6/ 2	10 YR 5/ 3

THORACIC REGION (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
T3 L lateral aspect of spinous process	10 YR 5/ 2	10 YR 5/ 2	10 YR 7/ 2	10 YR 6/ 2	10 YR 5/ 3	N 2.0	10 YR 6/ 3	7.5YR 5/ 2
T3 L lateral aspect of spinous process	7.5YR 7/ 2	5 YR 5/ 2	10 YR 5/ 2	7.5YR 7/ 2	10 YR 5/ 2	N 2.0	10 YR 5/ 1	7.5YR 6/ 2
T3 R lateral aspect of spinous process	7.5YR 6/ 2	2.5Y 6/ 1	10 YR 5/ 2	7.5YR 5/ 3	5 YR 5/ 2	10 YR 3/ 1	7.5YR 5/ 3	7.5YR 6/ 3
T3 R lateral aspect of spinous process	10 YR 6/ 2	2.5Y 6/ 1	5 YR 4/ 2	10 YR 4/ 2	10 YR 5/ 2	N 2.0	10 YR 5/ 2	10 YR 6/ 2
T3 R articular process/cavity for rib head	10 YR 7/ 2	7.5YR 5/ 2	7.5YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	N 2.5	10 YR 5/ 2	10 YR 4/ 2
T2 L articular process/cavity for rib head	10 YR 4/ 2	2.5Y 3/ 2	10 YR 6/ 2	7.5YR 5/ 6	2.5Y 4/ 2	2.5Y 2/ 1	7.5YR 6/ 3	10 YR 5/ 4
T2 L lateral aspect of spinous process	2.5Y 6/ 1	2.5Y 3/ 2	10 YR 6/ 2	7.5YR 5/ 3	10 YR 5/ 4	5 YR 4/ 1	7.5YR 7/ 2	10 YR 6/ 2
T2 L lateral aspect of spinous process	10 YR 6/ 2	10 YR 4/ 2	10 YR 5/ 2	10 YR 6/ 4	10 YR 5/ 3	N 3.0	10 YR 5/ 2	5 YR 6/ 3
T2 R lateral aspect of spinous process	7.5YR 6/ 3	2.5Y 5/ 2	10 YR 5/ 2	7.5YR 6/ 4	10 YR 6/ 1	N 4.5	2.5Y 6/ 1	7.5YR 6/ 3
T2 R lateral aspect of spinous process	7.5YR 5/ 2	10 YR 5/ 2	2.5Y 6/ 1	7.5YR 5/ 3	10 YR 3/ 3	10 B 5/ 1	7.5YR 4/ 2	7.5YR 5/ 2
T2 R articular process/cavity for rib head	2.5Y 5/ 2	10 YR 4/ 3	2.5Y 5/ 3	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 2/ 1	7.5YR 4/ 3	10 YR 5/ 3
T1 L articular process/cavity for rib head	7.5YR 5/ 3	N/A	N/A	N/A	2.5Y 4/ 1	2.5Y 2/ 1	N/A	7.5YR 6/ 4
T1 L lateral aspect of spinous process	5 YR 4/ 1	N/A	N/A	N/A	10 YR 5/ 2	2.5Y 2/ 1	N/A	10 YR 6/ 4
T1 L lateral aspect of spinous process	7.5YR 5/ 2	N/A	N/A	N/A	10 YR 5/ 2	N 2.5	N/A	7.5YR 6/ 2
T1 R lateral aspect of spinous process	7.5YR 5/ 2	N/A	N/A	N/A	2.5Y 6/ 1	10 YR 3/ 1	N/A	7.5YR 6/ 2
T1 R lateral aspect of spinous process	7.5YR 5/ 2	N/A	N/A	N/A	10 YR 4/ 3	N 2.5	N/A	7.5YR 6/ 2
T1 R articular process/cavity for rib head	10 YR 6/ 2	N/A	N/A	N/A	10 YR 5/ 3	N 1.0	N/A	7.5YR 6/ 3
CERVICAL REGION								
C7 L lateral aspect of arch	10 YR 4/ 3	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 3	N 4.0	10 YR 5/ 2	2.5Y 4/ 1
C7 L lateral aspect of spinous process	10 YR 6/ 1	10 YR 6/ 2	10 YR 5/ 1	10 YR 2/ 1	10 YR 4/ 3	7.5YR 4/ 1	10 YR 6/ 2	5 YR 6/ 2
C7 L transverse process	2.5Y 6/ 2	10 YR 4/ 2	10 YR 4/ 2	7.5YR 4/ 3	10 YR 5/ 2	2.5Y 2/ 1	7.5Y 4/ 1	2.5Y 5/ 2
C7 R lateral aspect of spinous process	7.5YR 7/ 1	10 YR 5/ 3	2.5Y 5/ 2	10 YR 6/ 2	2.5Y 6/ 1	N 3.5	10 YR 5/ 2	7.5YR 6/ 2
C7 R lateral aspect of arch	10 YR 5/ 1	10 YR 4/ 3	7.5YR 4/ 3	10 YR 4/ 2	2.5Y 4/ 2	N 3.5	7.5YR 4/ 3	10 YR 5/ 2
C7 R transverse process	10 YR 3/ 2	10 YR 4/ 2	10 YR 2/ 2	5 YR 4/ 3	2.5Y 7/ 2	N 2.5	7.5YR 3/ 3	7.5YR 6/ 3
C6 L lateral aspect of arch	10 YR 4/ 2	10 YR 4/ 2	7.5Y 4/ 1	7.5YR 4/ 3	10 YR 4/ 3	10 YR 3/ 1	10 YR 4/ 3	10 YR 5/ 4

CERVICAL REGION (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
C6 L lateral aspect of spinous process	10 YR 6/ 2	7.5YR 5/ 3	10 YR 5/ 2	7.5YR 3/ 2	2.5Y 5/ 2	N 4.5	7.5YR 2/ 3	7.5YR 5/ 2
C6 L transverse process	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 3/ 2	10 YR 5/ 2	N 3.5	7.5YR 5/ 3	10 YR 6/ 3
C6 R lateral aspect of spinous process	10 Y 7/ 1	10 YR 6/ 2	10 YR 5/ 3	2.5Y 4/ 2	2.5Y 6/ 1	N 5.5	10 YR 3/ 3	10 YR 6/ 2
C6 R lateral aspect of arch	2.5Y 5/ 1	2.5Y 3/ 3	7.5YR 3/ 2	10 YR 4/ 1	2.5Y 6/ 1	N 3.0	7.5YR 4/ 4	10 YR 5/ 3
C6 R transverse process	10 YR 5/ 1	10 YR 5/ 2	10 YR 4/ 3	10 YR 4/ 2	5 Y 7/ 1	N/A	10 YR 5/ 2	10 YR 4/ 3
C5 L lateral aspect of arch	10 YR 3/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 3/ 3	10 YR 4/ 3	N 2.5	7.5YR 5/ 2	7.5YR 5/ 2
C5 L lateral aspect of spinous process	2.5Y 4/ 1	10 YR 6/ 3	5 YR 5/ 2	10 YR 3/ 2	10 YR 4/ 2	10 YR 4/ 1	7.5YR 5/ 2	7.5YR 5/ 2
C5 L transverse process	7.5YR 5/ 2	10 YR 6/ 3	10 YR 4/ 2	7.5YR 3/ 3	10 YR 5/ 2	7.5Y 2/ 1	2.5Y 5/ 1	2.5Y 7/ 4
C5 R lateral aspect of spinous process	2.5Y 5/ 2	7.5Y 4/ 1	2.5GY 4/ 2	2.5Y 3/ 2	2.5Y 5/ 2	5 Y 4/ 1	10 YR 3/ 2	10 YR 5/ 2
C5 R lateral aspect of arch	10 YR 4/ 2	10 YR 7/ 2	2.5Y 2/ 1	N 1.0	10 YR 6/ 2	2.5Y 2/ 1	7.5YR 4/ 3	10 YR 4/ 2
C5 R transverse process	10 YR 5/ 1	10 YR 5/ 2	10 YR 6/ 2	7.5YR 5/ 3	10 YR 4/ 2	10 YR 2/ 2	10 YR 5/ 2	10 YR 4/ 2
C4 L lateral aspect of arch	10 YR 3/ 2	10 YR 2/ 2	10 YR 5/ 2	2.5Y 2/ 2	2.5Y 4/ 2	N 1.5	5 YR 5/ 2	10 YR 6/ 2
C4 L lateral aspect of spinous process	10 YR 5/ 2	7.5YR 3/ 2	10 YR 5/ 2	10 YR 4/ 2	10 YR 5/ 2	N/A	7.5YR 7/ 2	2.5Y 6/ 2
C4 L transverse process	7.5YR 6/ 2	10 YR 4/ 2	5 Y 6/ 1	7.5YR 3/ 3	10 YR 5/ 2	N 1.0	10 YR 5/ 2	2.5Y 7/ 4
C4 R lateral aspect of spinous process	2.5Y 4/ 1	10 YR 6/ 2	2.5Y 4/ 1	2.5Y 5/ 2	2.5Y 5/ 2	N/A	2.5Y 5/ 2	2.5Y 6/ 2
C4 R lateral aspect of arch	2.5GY 3/ 1	7.5YR 5/ 3	7.5YR 5/ 2	2.5Y 4/ 2	2.5Y 6/ 1	7.5YR 2/ 1	10 YR 4/ 3	10 YR 5/ 3
C4 R transverse process	10 YR 4/ 2	7.5YR 6/ 3	7.5YR 5/ 2	10 YR 6/ 3	7.5YR 6/ 2	10 YR 5/ 2	2.5Y 5/ 1	7.5YR 5/ 3
C3 L lateral aspect of arch	10 YR 4/ 2	10 YR 5/ 2	2.5Y 3/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 3/ 3	10 YR 2/ 2	10 YR 6/ 2
C3 L lateral aspect of spinous process	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 5/ 3	7.5YR 4/ 3	10 YR 4/ 3	10 YR 6/ 2
C3 L transverse process	7.5YR 4/ 3	10 YR 5/ 2	10 YR 5/ 1	7.5YR 3/ 3	10 YR 4/ 2	10 YR 3/ 3	2.5Y 7/ 2	10 YR 4/ 3
C3 R lateral aspect of spinous process	7.5Y 4/ 1	10 YR 5/ 2	10 YR 5/ 2	10 YR 4/ 2	10 YR 4/ 2	7.5YR 3/ 3	10 YR 5/ 2	10 YR 6/ 2
C3 R lateral aspect of arch	10 YR 3/ 2	10 YR 6/ 2	10 YR 4/ 2	7.5Y 4/ 1	7.5YR 6/ 1	10 YR 2/ 2	7.5YR 4/ 3	7.5YR 5/ 4
C3 R transverse process	2.5Y 3/ 2	10 YR 6/ 2	10 YR 5/ 3	10 YR 5/ 3	10 YR 5/ 3	7.5YR 2/ 3	2.5Y 5/ 2	7.5YR 5/ 3
C2 L lateral aspect of arch	10 YR 5/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 2/ 2	10 YR 3/ 3	7.5YR 5/ 2
C2 L lateral aspect of spinous process	10 YR 6/ 2	7.5YR 5/ 3	10 YR 5/ 3	7.5YR 4/ 3	10 YR 6/ 2	10 YR 3/ 2	10 YR 4/ 3	5 YR 4/ 2

CERVICAL REGION (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
C2 L transverse process	10 YR 4/ 2	10 YR 3/ 2	10 YR 4/ 1	7.5YR 3/ 3	2.5Y 4/ 2	7.5YR 2/ 3	5 Y 4/ 2	10 YR 5/ 3
C2 R lateral aspect of spinous process	7.5YR 6/ 2	10 YR 7/ 2	2.5Y 7/ 2	7.5YR 5/ 2	2.5Y 6/ 2	2.5Y 4/ 3	7.5YR 5/ 3	7.5YR 6/ 2
C2 R lateral aspect of arch	10 YR 5/ 2	2.5Y 6/ 1	10 YR 5/ 1	10 YR 4/ 2	2.5Y 5/ 2	10 YR 4/ 3	7.5YR 5/ 2	10 YR 5/ 2
C2 R transverse process	10 YR 5/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 4/ 2	10 YR 5/ 2	10 YR 2/ 2	10 YR 4/ 2	7.5YR 5/ 3
C1 L wing	2.5Y 2/ 1	10 YR 6/ 2	7.5YR 5/ 3	7.5YR 3/ 2	10 YR 4/ 2	10 YR 5/ 3	10 YR 5/ 3	10 YR 6/ 2
C1 dorsal tuberosity	2.5Y 5/ 2	7.5YR 4/ 3	10 YR 5/ 3	7.5YR 6/ 2	2.5Y 6/ 1	N 1.5	2.5YR 4/ 4	7.5YR 6/ 2
C1 R wing	10 YR 3/ 2	N/A	7.5YR 5/ 2	7.5YR 3/ 3	7.5YR 3/ 2	7.5YR 6/ 3	5 YR 4/ 3	N/A
SACRUM								
right auricular surface	10 YR 4/ 3	10 YR 3/ 4	7.5YR 4/ 3	10 YR 6/ 2	10 YR 2/ 1	10 YR 6/ 2	10 YR 5/ 3	10 YR 5/ 2
left auricular surface	7.5YR 5/ 3	10 YR 3/ 3	7.5YR 3/ 2	10 YR 5/ 2	2.5Y 3/ 1	2.5Y 6/ 2	2.5Y 4/ 4	10 YR 6/ 4
arches of sacral vertebrae	2.5Y 2/ 2	5 YR 3/ 2	2.5Y 6/ 2	2.5Y 5/ 2	N 1.0	N 1.0	10 YR 3/ 1	2.5Y 4/ 2
arches of sacral vertebrae	2.5Y 3/ 2	10 YR 3/ 3	7.5YR 5/ 2	7.5YR 4/ 2	2.5Y 3/ 1	7.5YR 2/ 1	10 YR 5/ 3	2.5Y 3/ 2
arches of sacral vertebrae	5 YR 4/ 2	5 YR 3/ 3	10 YR 6/ 2	10 YR 5/ 4	N 2.0	7.5Y 2/ 1	7.5YR 4/ 3	10 YR 4/ 2
arches of sacral vertebrae	10 YR 6/ 2	10 YR 2/ 2	2.5Y 6/ 1	10 YR 6/ 3	10 YR 3/ 1	2.5Y 4/ 1	7.5YR 5/ 3	10 YR 4/ 2
arches of sacral vertebrae	7.5YR 5/ 2	7.5YR 3/ 3	10 YR 7/ 2	7.5YR 5/ 3	N 1.5	7.5YR 5/ 3	2.5Y 5/ 2	10 YR 6/ 2
SACRUM (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
ventral aspect of sacral body	7.5YR 4/ 3	2.5Y 2/ 1	2.5Y 5/ 1	10 YR 5/ 3	7.5YR 3/ 1	2.5Y 2/ 2	7.5YR 6/ 2	10 YR 6/ 2
ventral aspect of sacral body	10 YR 5/ 2	10 YR 5/ 2	7.5YR 4/ 3	10 YR 5/ 3	2.5Y 4/ 1	7.5YR 3/ 3	10 YR 5/ 3	10 YR 6/ 3
ventral aspect of sacral body	10 YR 6/ 2	7.5YR 5/ 4	7.5YR 4/ 3	10 YR 3/ 3	2.5Y 4/ 1	10 YR 4/ 2	7.5YR 4/ 3	2.5Y 6/ 2
ventral aspect of sacral body	2.5Y 6/ 1	10 YR 6/ 3	10 YR 4/ 2	7.5YR 3/ 3	2.5Y 4/ 1	2.5Y 4/ 3	7.5YR 3/ 3	10 YR 4/ 2
ventral aspect of sacral body	10 YR 5/ 1	10 YR 6/ 3	7.5YR 4/ 2	7.5YR 3/ 3	10 YR 3/ 1	10 YR 4/ 2	7.5YR 3/ 2	7.5YR 5/ 2
LEFT RIBS								
R1 L head	7.5YR 6/ 3	10 YR 7/ 3	10 YR 6/ 2	10 YR 7/ 3	10 YR 5/ 2	7.5YR 4/ 3	10 YR 5/ 4	10 YR 7/ 4
R1 L tubercule	7.5YR 6/ 3	10 YR 5/ 3	10 YR 5/ 2	7.5YR 5/ 4	7.5YR 4/ 2	N/A	7.5YR 7/ 3	10 YR 8/ 4
R1 L lateral aspect of shaft	10 YR 3/ 2	7.5YR 4/ 3	7.5YR 4/ 2	7.5YR 7/ 3	10 YR 5/ 2	N 2.0	5 YR 5/ 3	7.5YR 6/ 3

LEFT RIBS	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R1 L lateral aspect of shaft	5 YR 5/ 2	10 YR 4/ 3	7.5YR 4/ 1	10 YR 7/ 2	10 YR 6/ 2	2.5G 2/ 1	10 YR 6/ 3	7.5YR 5/ 3
R1 L lateral aspect of shaft	5 YR 3/ 3	10 YR 5/ 4	10 YR 5/ 1	7.5YR 5/ 6	10 YR 5/ 2	10 YR 2/ 1	7.5YR 6/ 3	7.5YR 6/ 3
R1 L medial aspect of shaft	7.5YR 4/ 2	2.5Y 4/ 3	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 4/ 2	N 2.0	7.5YR 3/ 3	10 YR 4/ 2
R1 L medial aspect of shaft	10 YR 5/ 2	2.5Y 6/ 3	10 YR 5/ 1	7.5YR 4/ 3	10 YR 6/ 2	N 1.5	10 YR 4/ 2	7.5YR 5/ 3
R1 L medial aspect of shaft	7.5YR 3/ 2	10 YR 5/ 3	10 YR 5/ 3	10 YR 5/ 3	10 YR 4/ 2	10 YR 3/ 1	7.5YR 5/ 3	10 YR 5/ 3
R1 L sternal end	7.5YR 4/ 3	7.5YR 5/ 3	10 YR 4/ 2	10 YR 7/ 3	2.5Y 4/ 2	7.5YR 5/ 1	7.5YR 5/ 3	10 YR 6/ 3
R2 L head	10 YR 7/ 3	10 YR 6/ 4	5 YR 6/ 3	7.5YR 5/ 4	2.5Y 4/ 2	5 YR 2/ 1	7.5YR 5/ 3	10 YR 8/ 3
R2 L tubercule	10 YR 6/ 2	7.5YR 5/ 4	7.5YR 6/ 3	5 YR 5/ 2	10 YR 5/ 2	N 2.0	7.5YR 4/ 3	10 YR 8/ 4
R2 L lateral aspect of shaft	10 YR 5/ 3	2.5Y 8/ 2	10 YR 7/ 2	7.5YR 6/ 2	2.5Y 7/ 1	5 PB 4/ 1	10 YR 5/ 2	10 YR 7/ 3
R2 L lateral aspect of shaft	5 YR 5/ 2	10 YR 6/ 3	7.5YR 7/ 2	10 YR 6/ 3	5 YR 7/ 2	N/A	10 YR 5/ 2	10 YR 6/ 4
R2 L lateral aspect of shaft	10 YR 6/ 3	10 YR 4/ 2	10 YR 4/ 2	10 YR 7/ 3	10 YR 8/ 3	7.5YR 3/ 1	2.5Y 6/ 1	10 YR 7/ 2
R2 L medial aspect of shaft	7.5YR 4/ 3	10 YR 4/ 3	10 YR 5/ 2	10 YR 4/ 2	10 YR 6/ 2	N 2.0	7.5YR 5/ 2	10 YR 6/ 3
R2 L medial aspect of shaft	7.5YR 5/ 2	10 YR 5/ 3	10 YR 6/ 2	7.5YR 5/ 3	10 YR 5/ 3	N 3.0	2.5YR 4/ 4	10 YR 5/ 4
R2 L medial aspect of shaft	10 YR 5/ 2	10 YR 4/ 2	10 YR 6/ 3	10 YR 5/ 4	10 YR 6/ 2	10 YR 2/ 1	10 YR 4/ 2	10 YR 6/ 3
R2 L sternal end	10 YR 5/ 3	10 YR 4/ 3	10 YR 6/ 3	10 YR 5/ 4	10 YR 6/ 3	10 YR 2/ 1	10 YR 4/ 2	2.5Y 6/ 3
R3 L head	10 YR 5/ 2	2.5GY 5/ 3	2.5Y 5/ 2	7.5YR 5/ 4	5 Y 5/ 2	2.5B 3/ 1	5 GY 4/ 3	7.5YR 6/ 4
R3 L tubercule	5 YR 5/ 3	7.5YR 5/ 3	7.5YR 6/ 3	7.5YR 4/ 3	10 YR 4/ 2	7.5GY 2/ 3	2.5YR 5/ 3	7.5YR 7/ 4
R3 L lateral aspect of shaft	7.5YR 5/ 2	10 YR 6/ 3	7.5YR 5/ 2	10 YR 4/ 2	7.5YR 7/ 2	N 2.5	7.5YR 8/ 2	7.5YR 7/ 4
R3 L lateral aspect of shaft	10 YR 5/ 2	10 YR 5/ 3	7.5YR 5/ 1	10 YR 8/ 3	10 YR 8/ 4	N 3.5	7.5YR 5/ 3	10 YR 6/ 3
R3 L lateral aspect of shaft	10 YR 5/ 2	10 YR 5/ 3	2.5Y 5/ 1	10 YR 5/ 3	7.5YR 6/ 3	N 3.0	7.5YR 4/ 3	7.5YR 4/ 3
R3 L medial aspect of shaft	10 YR 5/ 1	10 YR 4/ 3	7.5YR 8/ 2	7.5YR 3/ 3	10 YR 4/ 2	N 2.5	7.5YR 4/ 3	7.5YR 5/ 2
R3 L medial aspect of shaft	10 YR 5/ 2	7.5YR 5/ 4	10 YR 7/ 2	7.5YR 6/ 3	7.5YR 6/ 3	10 GY 3/ 1	5 YR 4/ 2	10 YR 4/ 2
R3 L medial aspect of shaft	5 YR 4/ 1	7.5YR 3/ 2	10 YR 5/ 3	10 YR 5/ 3	7.5YR 4/ 3	10 Y 3/ 1	10 YR 5/ 3	7.5YR 4/ 3
R3 L sternal end	10 YR 5/ 3	10 YR 5/ 3	10 YR 5/ 4	10 YR 5/ 3	10 YR 6/ 3	10 YR 2/ 1	10 YR 3/ 1	7.5YR 4/ 3
R4 L head	10 YR 4/ 2	10 YR 5/ 3	10 YR 6/ 3	7.5YR 4/ 3	10 YR 5/ 4	N 2.0	5 Y 5/ 1	10 YR 5/ 4

LEFT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R4 L tubercule	5 YR 4/ 3	7.5YR 5/ 4	2.5Y 5/ 3	7.5YR 5/ 4	10 YR 4/ 2	10 R 2/ 2	7.5YR 6/ 1	7.5YR 5/ 4
R4 L lateral aspect of shaft	10 YR 3/ 2	10 YR 7/ 3	5 YR 4/ 2	7.5YR 5/ 4	10 YR 6/ 2	2.5PB 4/ 1	7.5YR 7/ 2	10 YR 6/ 2
R4 L lateral aspect of shaft	7.5YR 5/ 3	7.5YR 6/ 4	10 YR 4/ 2	7.5YR 6/ 4	10 YR 8/ 2	N 2.5	10 YR 7/ 2	10 YR 6/ 3
R4 L lateral aspect of shaft	7.5YR 5/ 3	10 YR 6/ 3	7.5YR 4/ 2	10 YR 7/ 2	10 YR 6/ 2	N 2.0	10 YR 4/ 2	10 YR 6/ 3
R4 L medial aspect of shaft	10 YR 4/ 2	10 YR 4/ 3	10 YR 7/ 2	7.5YR 4/ 3	10 YR 5/ 3	10 YR 2/ 1	7.5YR 5/ 2	10 YR 5/ 2
R4 L medial aspect of shaft	7.5YR 5/ 3	7.5YR 6/ 2	10 YR 6/ 3	10 YR 6/ 2	7.5YR 6/ 3	N 2.5	5 YR 4/ 3	10 YR 5/ 3
R4 L medial aspect of shaft	10 YR 5/ 1	7.5YR 4/ 3	10 YR 4/ 2	7.5YR 6/ 2	10 YR 5/ 3	N 3.5	10 YR 5/ 3	10 YR 5/ 4
R4 L sternal end	10 YR 5/ 4	10 YR 5/ 3	10 YR 5/ 4	7.5YR 5/ 3	10 YR 5/ 2	N 2.0	10 YR 5/ 3	10 YR 6/ 4
R5 L head	7.5YR 4/ 3	10 YR 5/ 3	2.5Y 6/ 2	7.5YR 3/ 3	10 YR 6/ 4	7.5Y 2/ 1	10 YR 6/ 2	10 YR 6/ 4
R5 L tubercule	10 YR 4/ 2	7.5YR 5/ 3	10 YR 5/ 2	7.5YR 4/ 4	7.5YR 5/ 2	2.5Y 2/ 1	5 Y 5/ 2	10 YR 5/ 4
R5 L lateral aspect of shaft	7.5YR 5/ 2	10 YR 5/ 4	10 YR 5/ 2	7.5YR 5/ 4	7.5YR 6/ 2	N 2.0	10 YR 6/ 3	10 YR 6/ 2
R5 L lateral aspect of shaft	7.5YR 6/ 2	2.5Y 8/ 2	10 YR 4/ 2	7.5YR 6/ 4	10 YR 6/ 2	N 4.0	7.5YR 8/ 2	7.5YR 4/ 4
R5 L lateral aspect of shaft	2.5Y 6/ 1	10 YR 6/ 3	10 YR 4/ 2	7.5YR 7/ 2	10 YR 7/ 3	N 2.5	10 YR 5/ 3	10 YR 5/ 2
R5 L medial aspect of shaft	10 YR 4/ 2	10 YR 5/ 2	10 YR 5/ 2	7.5YR 4/ 3	10 YR 6/ 2	N 1.5	7.5YR 4/ 3	10 YR 5/ 3
R5 L medial aspect of shaft	7.5YR 5/ 2	10 YR 5/2	10 YR 6/ 2	10 YR 6/ 3	7.5YR 6/ 2	5P 3/2	2.5Y 5/ 2	10 YR 4/ 2
R5 L medial aspect of shaft	7.5YR 5/ 2	7.5YR 3/ 3	7.5YR 2/ 2	7.5YR 5/ 4	10 YR 5/ 2	10 YR 2/ 1	10 YR 5/ 2	10 YR 5/ 2
R5 L sternal end	10 YR 4/ 3	10 YR 3/ 2	10 YR 4/ 4	10 YR 4/ 3	7.5YR 5/ 3	7.5YR 2/ 1	7.5YR 5/ 4	7.5YR 4/ 3
R6 L head	7.5YR 4/ 3	10 YR 6/ 3	10 YR 5/ 2	7.5YR 4/ 3	2.5Y 4/ 4	N 4.5	10 YR 6/ 3	10 YR 6/ 3
R6 L tubercule	10 YR 5/ 2	5 YR 5/ 3	10 YR 5/ 3	7.5YR 5/ 3	10 YR 4/ 2	10 YR 2/ 1	7.5YR 5/ 1	7.5YR 5/ 4
R6 L lateral aspect of shaft	7.5YR 3/ 2	7.5YR 5/ 3	2.5Y 6/ 2	10 YR 6/ 3	10 YR 5/ 2	N 2.5	7.5YR 6/ 3	10 YR 7/ 3
R6 L lateral aspect of shaft	7.5YR 5/ 3	7.5YR 6/ 3	10 YR 6/ 3	10 YR 6/ 3	10 YR 5/ 2	10 YR 4/ 1	10 YR 7/ 2	7.5YR 6/ 4
R6 L lateral aspect of shaft	10 YR 6/ 1	7.5YR 5/ 4	10 YR 6/ 2	10 YR 5/ 3	10 YR 5/ 2	N/A	10 YR 4/ 2	10 YR 6/ 2
R6 L medial aspect of shaft	10 YR 5/ 2	2.5Y 5/ 1	10 YR 5/ 3	10 YR 3/ 3	10 YR 4/ 2	2.5GY 2/ 1	10 YR 4/ 3	10 YR 4/ 3
R6 L medial aspect of shaft	7.5YR 7/ 2	7.5YR 4/ 3	10 YR 5/ 3	10 YR 7/ 3	10 YR 6/ 2	2.5G 2/ 1	10 YR 5/ 2	10 YR 5/ 3
R6 L medial aspect of shaft	7.5YR 4/ 2	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 4/ 3	7.5YR 5/ 2	N/A	10 YR 4/ 2	7.5YR 4/ 3

LEFT RIBS (cont'd)	**Pig #1**	**Pig #2**	**Pig #3**	**Pig # 4**	**Pig #5**	**Pig #6**	**Pig #7**	**Pig #8**
R6 L sternal end	10 YR 4/ 3	10 YR 4/ 3	10 YR 3/ 3	10 YR 4/ 3	7.5YR 5/ 3	N/A	10 YR 5/ 3	10 YR 4/ 3
R7 L head	10 YR 5/ 2	2.5Y 6/ 3	10 YR 4/ 2	7.5YR 3/ 2	2.5Y 4/ 3	10 YR 3/ 1	2.5GY 5/ 2	10 YR 5/ 3
R7 L tubercule	10 YR 5/ 2	10 YR 5/ 4	10 YR 6/ 3	7.5YR 5/ 6	2.5Y 6/ 2	7.5YR 3/ 1	10 YR 3/ 2	10 YR 4/ 3
R7 L lateral aspect of shaft	7.5YR 6/ 3	2.5Y 5/ 2	7.5YR 6/ 3	7.5YR 3/ 3	10 YR 6/ 2	N 2.0	7.5YR 5/ 2	10 YR 6/ 3
R7 L lateral aspect of shaft	10 YR 5/ 2	10 YR 7/ 3	7.5YR 7/ 2	10 YR 6/ 3	7.5YR 7/ 2	5 YR 2/ 1	7.5YR 6/ 3	7.5YR 6/ 3
R7 L lateral aspect of shaft	7.5YR 4/ 3	7.5YR 5/ 2	10 YR 5/ 2	10 YR 7/ 2	10 YR 6/ 2	10 YR 2/ 1	7.5YR 5/ 4	10 YR 4/ 2
R7 L medial aspect of shaft	2.5Y 2/ 1	10 YR 5/ 2	5 Y 5/ 8	7.5YR 3/ 3	10 YR 6/ 2	N 1.5	7.5YR 6/ 2	10 YR 4/ 2
R7 L medial aspect of shaft	10 YR 6/ 2	7.5YR 4/ 4	2.5Y 6/ 1	2.5Y 5/ 3	10 YR 6/ 3	N 3.5	7.5YR 4/ 3	10 YR 5/ 3
R7 L medial aspect of shaft	7.5YR 4/ 2	7.5YR 3/ 3	7.5YR 4/ 2	7.5YR 6/ 2	2.5Y 5/ 2	N 2.0	2.5Y 4/ 2	10 YR 4/ 2
R7 L sternal end	7.5YR 4/ 3	7.5YR 3/ 3	2.5Y 3/ 3	7.5YR 5/ 3	7.5YR 5/ 3	2.5Y 2/ 1	7.5YR 4/ 3	2.5Y 4/ 4
R8 L head	10 YR 4/ 3	2.5Y 7/ 2	10 YR 5/ 3	7.5YR 3/ 2	10 YR 6/ 2	N 1.5	10 YR 6/ 3	10 YR 5/ 3
R8 L tubercule	7.5YR 5/ 3	10 GY 5/ 2	7.5YR 5/ 3	10 YR 5/ 4	5 Y 5/ 2	10 Y 2/ 2	7.5YR 5/ 3	10 YR 5/ 3
R8 L lateral aspect of shaft	10 YR 6/ 3	7.5YR 5/ 3	10 YR 7/ 2	7.5YR 5/ 4	7.5YR 6/ 2	N 2.5	7.5YR 7/ 3	7.5YR 7/ 3
R8 L lateral aspect of shaft	10 YR 6/ 1	10 YR 6/ 4	7.5YR 6/ 3	7.5YR 7/ 3	N/A	N/A	10 YR 7/ 2	10 YR 5/ 3
R8 L lateral aspect of shaft	10 YR 5/ 3	10 YR 5/ 3	7.5YR 5/ 2	7.5YR 5/ 3	N 3.5	N/A	7.5YR 4/ 3	7.5YR 3/ 2
R8 L medial aspect of shaft	10 YR 5/ 2	5 Y 5/ 1	2.5Y 4/ 1	10 YR 4/ 3	10 YR 6/ 2	5 RP 2/ 3	10 YR 4/ 2	10 YR 5/ 2
R8 L medial aspect of shaft	10 YR 7/ 2	7.5YR 4/ 3	7.5YR 5/ 2	10 YR 6/ 4	7.5YR 6/ 3	N/A	10 YR 5/ 2	10 YR 5/ 2
R8 L medial aspect of shaft	10 YR 5/ 3	7.5YR 4/ 2	7.5YR 4/ 2	7.5YR 4/ 3	7.5YR 6/ 2	N/A	10 YR 4/ 2	7.5YR 3/ 2
R8 L sternal end	10 YR 5/ 3	10 YR 4/ 3	7.5YR 5/ 3	5 YR 3/ 4	10 YR 4/ 2	N/A	7.5YR 4/ 3	10 YR 5/ 3
R9 L head	7.5YR 5/ 4	2.5Y 7/ 2	2.5Y 3/ 3	10 YR 4/ 4	10 YR 5/ 2	10 YR 4/ 1	7.5YR 5/ 4	7.5YR 5/ 3
R9 L tubercule	5 YR 5/ 2	7.5YR 5/ 3	7.5YR 6/ 3	5 YR 3/ 4	10 YR 5/ 3	N 5.0	7.5R 6/ 2	7.5YR 7/ 4
R9 L lateral aspect of shaft	7.5YR 6/ 2	10 YR 5/ 2	7.5YR 7/ 3	7.5YR 7/ 3	10 YR 6/ 2	N 2.0	10 YR 5/ 3	7.5YR 6/ 4
R9 L lateral aspect of shaft	7.5YR 7/ 2	7.5YR 5/ 3	7.5YR 6/ 3	7.5YR 7/ 3	10 YR 5/ 2	N 2.0	7.5YR 5/ 3	10 YR 5/ 3
R9 L lateral aspect of shaft	7.5YR 5/ 3	10 YR 5/ 3	10 YR 4/ 2	7.5YR 7/ 3	N/A	N 2.0	7.5YR 3/ 2	10 YR 5/ 2
R9 L medial aspect of shaft	10 YR 5/ 2	2.5G 5/ 2	10 YR 4/ 2	7.5YR 4/ 3	7.5YR 5/ 2	10 G 2/ 1	7.5YR 5/ 3	10 YR 6/ 2

LEFT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R9 L medial aspect of shaft	5 YR 6/ 2	10 YR 5/ 3	10 YR 5/ 2	7.5YR 7/ 2	7.5YR 6/ 3	N 4.0	10 YR 4/ 2	10 YR 4/ 3
R9 L medial aspect of shaft	10 YR 5/ 3	10 YR 5/ 2	10 YR 3/ 2	7.5YR 6/ 2	10 YR 3/ 3	N 2.0	7.5YR 3/ 2	7.5YR 5/ 3
R9 L sternal end	10 YR 4/ 3	7.5YR 4/ 4	7.5YR 5/ 3	7.5YR 5/ 3	N/A	N 1.5	10 YR 4/ 3	10 YR 5/ 2
R10 L head	10 YR 5/ 3	7.5YR 4/ 2	5 YR 4/ 2	10 YR 5/ 4	7.5YR 5/ 2	10 YR 3/ 1	10 YR 8/ 2	10 YR 4/ 2
R10 L tubercule	10 YR 5/ 2	7.5YR 3/ 3	7.5YR 6/ 3	10 YR 4/ 2	10 YR 5/ 2	10 YR 2/ 1	2.5Y 6/ 1	10 YR 6/ 3
R10 L lateral aspect of shaft	10 YR 2/ 1	2.5Y 5/ 2	10 YR 5/ 2	10 YR 4/ 2	10 YR 6/ 2	N/A	7.5YR 6/ 3	2.5Y 5/ 3
R10 L lateral aspect of shaft	7.5YR 6/ 2	7.5YR 5/ 3	7.5YR 5/ 3	7.5YR 6/ 3	2.5Y 6/ 1	N/A	10 YR 5/ 2	10 YR 5/ 3
R10 L lateral aspect of shaft	7.5YR 5/ 3	7.5YR 4/ 3	2.5Y 5/ 1	10 YR 6/ 2	N 3.5	N/A	10 YR 4/ 3	10 YR 5/ 2
R10 L medial aspect of shaft	10 YR 5/ 2	10 YR 4/ 2	10 YR 4/ 1	10 YR 5/ 3	10 YR 5/ 2	N/A	10 YR 5/ 3	10 YR 5/ 2
R10 L medial aspect of shaft	2.5Y 6/ 1	7.5YR 5/ 3	5 YR 4/ 2	10 YR 6/ 2	10 YR 5/ 3	N/A	7.5YR 4/ 2	7.5YR 5/ 3
R10 L medial aspect of shaft	10 YR 5/ 2	10 YR 4/ 2	10 YR 5/ 2	10 YR 5/ 2	N 3.5	N/A	7.5YR 4/ 3	2.5Y 3/ 2
R10 L sternal end	10 YR 4/ 3	10 YR 5/ 3	10 YR 6/ 2	10 YR 6/ 4	7.5YR 2/ 1	N/A	10 YR 4/ 2	10 YR 5/ 3
R11 L head	10 YR 5/ 3	2.5Y 5/ 2	10 YR 3/ 2	7.5YR 5/ 4	10 YR 5/ 2	7.5YR 3/ 3	5 YR 4/ 3	10 YR 6/ 3
R11 L tubercule	10 YR 4/ 2	10 YR 3/ 2	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 5/ 2	10 YR 4/ 3	10 YR 5/ 4	2.5Y 5/ 2
R11 L lateral aspect of shaft	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 6/ 3	10 YR 5/ 2	7.5Y 2/ 1	7.5YR 5/ 2	10 YR 7/ 3
R11 L lateral aspect of shaft	2.5Y 7/ 1	7.5YR 5/ 4	10 YR 5/ 3	2.5Y 7/ 2	10 YR 5/ 2	10 YR 2/ 1	10 YR 5/ 2	10 YR 5/ 3
R11 L lateral aspect of shaft	10 YR 5/ 2	10 YR 4/ 3	10 YR 5/ 2	7.5YR 5/ 3	7.5G 3/ 1	N 2.0	10 YR 4/ 2	2.5Y 5/ 1
R11 L medial aspect of shaft	2.5Y 4/ 1	7.5YR 5/ 3	7.5YR 4/ 2	10 YR 3/ 2	10 YR 5/ 2	N 1.0	10 YR 5/ 3	10 YR 6/ 3
R11 L medial aspect of shaft	10 YR 6/ 1	7.5YR 6/ 2	7.5YR 4/ 2	10 YR 6/ 2	7.5YR 6/ 2	10 BG 2/ 2	10 YR 2/ 2	7.5YR 5/ 2
R11 L medial aspect of shaft	7.5YR 5/ 3	7.5YR 4/ 2	7.5GY 4/ 1	10 YR 6/ 3	2.5Y 4/ 1	N 2.0	7.5YR 6/ 3	10 YR 4/ 2
R11 L sternal end	10 YR 5/ 3	10 YR 5/ 3	10 YR 5/ 3	10 YR 6/ 3	10 YR 4/ 1	N/A	7.5YR 5/ 4	10 YR 5/ 3
R12 L head	10 YR 5/ 4	10 YR 5/ 3	7.5YR 5/ 3	10 YR 6/ 3	2.5YR 5/ 2	7.5YR 2/ 3	10 YR 4/ 2	10 YR 6/ 3
R12 L tubercule	10 YR 5/ 2	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 5/ 4	10 YR 6/ 2	2.5YR 3/ 2	7.5YR 2/ 3	7.5YR 6/ 4
R12 L lateral aspect of shaft	2.5Y 6/ 1	10 YR 5/ 3	10 YR 4/ 2	7.5YR 6/ 4	10 YR 6/ 2	7.5YR 2/ 1	7.5YR 4/ 2	10 YR 7/ 3
R12 L lateral aspect of shaft	7.5YR 7/ 1	7.5YR 4/ 3	7.5YR 4/ 2	10 YR 6/ 3	7.5YR 5/ 3	N 1.0	2.5Y 4/ 2	10 YR 7/ 4

LEFT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R12 L lateral aspect of shaft	10 YR 6/ 2	7.5YR 4/ 4	10 YR 6/ 2	10 YR 4/ 3	10 YR 4/ 2	7.5YR 4/ 1	10 YR 6/ 3	10 YR 4/ 2
R12 L medial aspect of shaft	10 YR 4/ 2	5 Y 4/ 3	2.5Y 4/ 1	10 YR 2/ 2	10 YR 6/ 3	7.5B 3/ 1	5 Y 5/ 3	10 YR 5/ 3
R12 L medial aspect of shaft	10 YR 6/ 2	7.5YR 5/ 3	10 YR 5/ 2	10 YR 5/ 2	10 YR 5/ 1	7.5YR 3/ 4	2.5Y 4/ 3	10 YR 4/ 3
R12 L medial aspect of shaft	10 YR 5/ 2	10 YR 4/ 3	2.5Y 6/ 2	10 YR 5/ 3	2.5Y 4/ 1	N 4.0	7.5YR 6/ 2	10 YR 4/ 2
R12 L sternal end	10 YR 5/ 3	7.5YR 4/ 4	2.5Y 5/ 4	2.5YR 3/ 2	N/A	N/A	10 YR 5/ 2	10 YR 5/ 2
R13 L head	10 YR 7/ 3	7.5Y 4/ 2	10 YR 4/ 2	7.5YR 3/ 3	N/A	N/A	2.5Y 4/ 6	N/A
R13 L tubercule	7.5YR 4/ 3	10 YR 5/ 3	10 YR 5/ 2	10 YR 4/ 2	N/A	N/A	10 PB 5/ 1	N/A
R13 L lateral aspect of shaft	5 YR 5/ 2	7.5YR 5/ 4	2.5Y 5/ 6	10 YR 4/ 2	N/A	N/A	7.5YR 4/ 2	N/A
R13 L lateral aspect of shaft	7.5YR 5/ 2	7.5YR 4/ 2	10 YR 6/ 2	10 YR 4/ 3	N/A	N/A	10 YR 5/ 2	N/A
R13 L lateral aspect of shaft	10 YR 5/ 2	10 YR 4/ 3	2.5Y 5/ 2	10 YR 4/ 2	N/A	N/A	2.5Y 5/ 2	N/A
R13 L medial aspect of shaft	10 YR 4/ 1	10 YR 5/ 2	5P 4/3	7.5YR 4/ 3	N/A	N/A	2.5Y 6/ 1	N/A
R13 L medial aspect of shaft	7.5YR 5/ 2	7.5YR 5/ 2	10 YR 3/ 2	7.5YR 3/ 2	N/A	N/A	10 YR 3/ 3	N/A
R13 L medial aspect of shaft	10 YR 5/ 2	10 YR 5/ 2	10 YR 5/ 2	7.5YR 4/ 4	N/A	N/A	10 YR 4/ 3	N/A
R13 L sternal end	7.5YR 4/ 3	10 YR 5/ 3	2.5Y 5/ 3	2.5Y 5/ 2	N/A	N/A	2.5Y 5/ 2	N/A
R14 L head	2.5Y 6/ 1	10 YR 4/ 3	10 YR 5/ 2	10 YR 4/ 2	N/A	N/A	7.5YR 6/ 4	N/A
R14 L tubercule	2.5Y 7/ 2	7.5YR 4/ 3	10 YR 6/ 3	7.5YR 4/ 4	N/A	N/A	2.5Y 6/ 3	N/A
R14 L lateral aspect of shaft	10 YR 5/ 1	7.5YR 5/ 3	10 YR 6/ 3	10 YR 7/ 2	N/A	N 3.5	10 YR 4/ 2	N/A
R14 L lateral aspect of shaft	7.5YR 5/ 2	10 YR 6/ 3	10 YR 4/ 2	10 YR 4/ 2	N/A	10 YR 2/ 1	2.5Y 6/ 2	N/A
R14 L lateral aspect of shaft	2.5Y 5/ 2	10 YR 5/ 3	10 YR 5/ 1	2.5Y 4/ 2	N/A	N 2.5	10 YR 4/ 2	N/A
R14 L medial aspect of shaft	10 YR 6/ 1	10 YR 4/ 3	7.5GY 4/ 2	10 YR 4/ 2	N/A	N 4.0	7.5YR 5/ 3	N/A
R14 L medial aspect of shaft	5 YR 5/ 2	10 YR 4/ 3	7.5YR 4/ 4	10 YR 3/ 2	N/A	N 4.5	7.5YR 4/ 1	N/A
R14 L medial aspect of shaft	10 YR 5/ 2	7.5YR 3/ 3	10 YR 4/ 2	10 YR 4/ 2	N/A	7.5YR 2/ 1	5 Y 5/ 8	N/A
R14 L sternal end	7.5YR 6/ 3	7.5YR 4/ 2	10 YR 5/ 3	10 YR 6/ 3	N/A	N 1.5	5 YR 3/ 3	N/A
R15 L head	2.5GY 6/ 1	N/A	N/A	7.5YR 5/ 3	N/A	N/A	5 Y 5/ 3	N/A
R15 L tubercule	10 YR 6/ 2	N/A	N/A	7.5YR 6/ 3	N/A	N/A	10 YR 6/ 3	N/A

LEFT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R15 L lateral aspect of shaft	7.5YR 6/ 2	N/A	N/A	5 Y 5/ 1	N/A	N 2.0	10 YR 5/ 4	N/A
R15 L lateral aspect of shaft	5 YR 4/ 2	N/A	N/A	10 YR 5/ 3	N/A	10 YR 2/ 1	10 YR 6/ 2	N/A
R15 L lateral aspect of shaft	10 YR 5/ 2	N/A	N/A	10 YR 4/ 2	N/A	2.5Y 3/ 1	2.5Y 5/ 2	N/A
R16 L medial aspect of shaft	10 R 6/ 1	N/A	N/A	7.5YR 4/ 3	N/A	N 1.5	10 YR 3/ 2	N/A
R16 L medial aspect of shaft	5 YR 5/ 1	N/A	N/A	2.5Y 7/ 1	N/A	10 YR 2/ 1	10 YR 4/ 2	N/A
R16 L medial aspect of shaft	10 YR 5/ 2	N/A	N/A	10 YR 5/ 2	N/A	N 3.5	10 YR 4/ 2	N/A
R16 L sternal end	10 YR 6/ 2	N/A	N/A	10 YR 4/ 2	N/A	N/A	10 Y 3/ 3	N/A
R17 L head	2.5YR 5/ 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L tubercule	7.5YR 7/ 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L lateral aspect of shaft	10 YR 5/ 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L lateral aspect of shaft	7.5YR 5/ 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L lateral aspect of shaft	10 YR 6/ 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L medial aspect of shaft	10 YR 5/ 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L medial aspect of shaft	10 YR 6/ 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L medial aspect of shaft	10 YR 4/ 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 sternal end	10 YR 4/ 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RIGHT Ribs								
R1 R head	10 YR 6/ 2	7.5YR 5/ 3	7.5YR 6/ 3	10 YR 5/ 4	10 YR 5/ 3	5 YR 2/ 2	2.5Y 6/ 3	10 YR 6/ 3
R1 R tubercule	10 YR 5/ 2	2.5Y 5/ 3	10 YR 5/ 2	10 YR 5/ 3	10 YR 5/ 3	10 YR 2/ 1	7.5YR 5/ 4	7.5YR 6/ 3
R1 R lateral aspect of shaft	7.5YR 6/ 1	7.5YR 4/ 3	10 YR 5/ 2	10 YR 5/ 2	10 YR 5/ 2	7.5YR 3/ 2	2.5Y 4/ 2	10 YR 4/ 2
R1 R lateral aspect of shaft	7.5YR 5/ 2	10 YR 5/ 3	7.5YR 5/ 2	7.5YR 5/ 3	10 YR 6/ 2	7.5YR 2/ 2	7.5YR 5/ 3	7.5YR 5/ 3
R1 R lateral aspect of shaft	10 YR 5/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 4/ 3	7.5YR 5/ 4	N 2.0	10 YR 6/ 3	10 YR 5/ 4
R1 R medial aspect of shaft	7.5YR 4/ 1	7.5YR 5/ 3	10 YR 5/ 1	2.5Y 4/ 2	7.5YR 6/ 2	N 2.0	2.5Y 3/ 3	10 YR 6/ 3
R1 R medial aspect of shaft	10 YR 5/ 2	10 YR 6/ 2	10 YR 7/ 2	10 YR 6/ 2	10 YR 5/ 2	7.5YR 2/ 1	7.5YR 5/ 2	7.5YR 5/ 2
R1 R medial aspect of shaft	10 YR 4/ 2	10 YR 5/ 3	10 YR 5/ 3	10 YR 6/ 3	2.5Y 5/ 1	N 3.0	10 YR 6/ 3	10 YR 5/ 3

RIGHT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R1 R sternal end	7.5YR 5/ 3	7.5YR 5/ 3	10 YR 5/ 3	10 YR 6/ 3	10 YR 6/ 4	5 YR 4/ 1	7.5YR 5/ 3	10 YR 7/ 3
R2 R head	7.5YR 5/ 3	10 YR 5/ 4	7.5YR 4/ 3	2.5Y 7/ 3	7.5YR 4/ 4	5 YR 2/ 1	7.5YR 4/ 4	7.5YR 5/ 3
R2 R tubercule	10 YR 4/ 2	5 Y 4/ 2	10 YR 4/ 2	7.5YR 4/ 3	7.5YR 4/ 3	7.5YR 3/ 3	7.5YR 4/ 3	10 YR 6/ 2
R2 R lateral aspect of shaft	7.5YR 6/ 2	7.5YR 4/ 4	10 YR 6/ 2	10 YR 6/ 3	10 YR 6/ 3	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 5/ 2
R2 R lateral aspect of shaft	5 YR 5/ 2	7.5YR 4/ 3	10 YR 6/ 2	7.5YR 5/ 3	7.5YR 7/ 2	10 YR 3/ 2	5 YR 4/ 2	7.5YR 6/ 2
R2 R lateral aspect of shaft	7.5YR 5/ 3	10 YR 4/ 3	10 YR 4/ 2	7.5YR 5/ 2	5 YR 7/ 2	7.5YR 3/ 2	10 YR 6/ 2	7.5YR 5/ 2
R2 R medial aspect of shaft	10 YR 5/ 1	7.5YR 5/ 3	10 YR 5/ 2	10 YR 4/ 2	10 YR 6/ 2	7.5YR 2/ 1	10 YR 4/ 2	10 YR 5/ 2
R2 R medial aspect of shaft	10 YR 5/ 2	10 YR 5/ 3	2.5Y 7/ 2	10 YR 6/ 3	7.5YR 7/ 2	N/A	7.5YR 6/ 3	10 YR 5/ 2
R2 R medial aspect of shaft	10 YR 6/ 2	10 YR 5/ 3	7.5YR 6/ 3	2.5Y 6/ 3	7.5YR 6/ 1	N/A	10 YR 5/ 2	10 YR 6/ 3
R2 R sternal end	10 YR 5/ 2	7.5YR 7/ 3	7.5YR 7/ 3	10 YR 6/ 4	10 YR 5/ 2	N/A	10 YR 4/ 3	7.5YR 5/ 4
R3 R head	7.5YR 4/ 3	7.5YR 5/ 4	10 YR 4/ 2	7.5YR 4/ 6	7.5YR 5/ 3	10 YR 4/ 3	2.5Y 4/ 6	10 YR 6/ 3
R3 R tubercule	7.5YR 5/ 3	7.5YR 3/ 3	10 YR 4/ 2	5 YR 4/ 3	2.5Y 6/ 2	2.5Y 2/ 2	2.5Y 5/ 2	10 YR 6/ 3
R3 R lateral aspect of shaft	2.5Y 6/ 1	10 YR 4/ 4	2.5Y 6/ 1	10 YR 5/ 3	7.5YR 7/ 1	7.5YR 4/ 3	7.5Y 5/ 1	7.5YR 5/ 4
R3 R lateral aspect of shaft	10 YR 6/ 1	7.5YR 2/ 3	2.5Y 7/ 1	10 YR 6/ 3	7.5YR 5/ 3	N/A	10 YR 5/ 2	10 YR 4/ 3
R3 R lateral aspect of shaft	10 YR 6/ 2	10 YR 4/ 2	10 YR 5/ 2	7.5YR 4/ 3	10 YR 4/ 3	N 4.0	7.5YR 4/ 3	7.5YR 5/ 4
R3 R medial aspect of shaft	2.5Y 5/ 1	7.5YR 5/ 3	10 YR 7/ 3	10 YR 7/ 2	7.5YR 7/ 1	10 YR 6/ 3	10 YR 4/ 2	10 YR 6/ 2
R3 R medial aspect of shaft	7.5YR 5/ 3	7.5YR 4/ 3	7.5YR 6/ 2	10 YR 6/ 3	7.5YR 7/ 2	N/A	10 YR 5/ 2	7.5YR 5/ 3
R3 R medial aspect of shaft	10 YR 5/ 2	10 YR 5/ 3	7.5YR 5/ 3	10 YR 6/ 3	2.5Y 6/ 1	N 2.5	10 YR 5/ 2	10 YR 6/ 3
R3 R sternal end	2.5Y 6/ 3	10 YR 5/ 3	7.5YR 6/ 3	7.5YR 5/ 3	7.5YR 7/ 3	2.5Y 5/ 1	10 YR 4/ 3	7.5YR 5/ 3
R4 R head	5 YR 4/ 3	7.5YR 4/ 3	2.5Y 5/ 2	7.5YR 5/ 4	7.5YR 4/ 3	7.5YR 2/ 1	7.5YR 5/ 4	7.5YR 5/ 3
R4 R tubercule	10 YR 5/ 2	5 Y 2/ 2	2.5Y 5/ 2	7.5YR 3/ 2	7.5YR 5/ 2	N 1.5	10 YR 4/ 2	5 YR 5/ 3
R4 R lateral aspect of shaft	7.5YR 5/ 3	7.5YR 5/ 3	5 YR 5/ 2	5 YR 3/ 2	5 YR 6/ 1	7.5YR 3/ 2	7.5YR 6/ 1	7.5YR 5/ 2
R4 R lateral aspect of shaft	7.5YR 6/ 3	7.5YR 4/ 3	5 YR 6/ 2	10 YR 6/ 3	7.5YR 5/ 3	5 YR 3/ 3	10 YR 5/ 1	10 YR 6/ 3
R4 R lateral aspect of shaft	7.5YR 4/ 3	7.5YR 3/ 3	2.5Y 5/ 2	10 YR 5/ 2	7.5YR 5/ 3	N 2.0	10 YR 5/ 1	10 YR 6/ 3
R4 R medial aspect of shaft	7.5YR 4/ 3	10 YR 3/ 4	10 YR 5/ 2	10 YR 5/ 3	10 YR 5/ 2	10 YR 6/ 2	10 YR 5/ 3	10 YR 5/ 1

RIGHT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R4 R medial aspect of shaft	7.5YR 4/ 3	10 YR 5/ 3	7.5YR 5/ 2	7.5YR 7/ 3	10 YR 6/ 2	N/A	10 YR 5/ 2	7.5YR 5/ 2
R4 R medial aspect of shaft	10 YR 4/ 2	10 YR 4/ 3	10 YR 5/ 2	10 YR 5/ 3	10 YR 6/ 2	N 2.5	10 YR 6/ 3	7.5YR 5/ 4
R4 R sternal end	7.5YR 3/ 3	10 YR 5/ 3	2.5YR 4/ 3	7.5YR 5/ 4	7.5YR 6/ 2	7.5YR 4/ 1	10 YR 6/ 3	10 YR 4/ 4
R5 R head	10 YR 4/ 2	10 YR 6/ 4	10 YR 6/ 3	7.5YR 2/ 3	7.5YR 5/ 3	N/A	10 YR 5/ 2	10 YR 5/ 2
R5 R tubercule	10 YR 5/ 2	10 YR 5/ 3	10 YR 5/ 2	5 Y 3/ 3	10 YR 5/ 2	N/A	2.5Y 5/ 2	10 YR 5/ 2
R5 R lateral aspect of shaft	2.5Y 6/ 1	5 YR 4/ 2	7.5YR 6/ 2	10 YR 5/ 2	2.5Y 8/ 1	N/A	10 YR 5/ 2	10 YR 6/ 2
R5 R lateral aspect of shaft	10 YR 4/ 2	7.5R 7/ 1	10 YR 7/ 2	10 YR 6/ 3	10 YR 5/ 2	N/A	10 YR 5/ 3	7.5YR 6/ 1
R5 R lateral aspect of shaft	5 YR 3/ 2	2.5Y 6/ 1	10 YR 6/ 2	7.5YR 6/ 2	10 YR 5/ 3	N 5.5	10 YR 4/ 2	5 YR 4/ 3
R5 R medial aspect of shaft	10 YR 5/ 2	10 YR 3/ 3	5 Y 5/ 1	7.5YR 3/ 3	2.5Y 5/ 2	N/A	10 YR 5/ 2	2.5Y 5/ 1
R5 R medial aspect of shaft	10 YR 5/ 1	7.5YR 5/ 2	7.5YR 5/ 2	10 YR 5/ 2	7.5YR 7/ 2	N/A	7.5YR 5/ 3	7.5YR 4/ 2
R5 R medial aspect of shaft	7.5YR 5/ 1	7.5YR 3/ 2	10 YR 4/ 2	10 YR 7/ 2	7.5YR 7/ 3	N 5.0	7.5YR 4/ 3	10 YR 4/ 2
R5 R sternal end	10 YR 4/ 2	10 YR 5/ 3	10 YR 5/ 4	10 YR 5/ 2	2.5Y 6/ 3	10 YR 4/ 1	10 YR 4/ 4	7.5YR 4/ 3
R6 R head	7.5YR 3/ 2	7.5YR 5/ 3	10 YR 5/ 2	10 YR 3/ 3	7.5YR 6/ 3	10 YR 2/ 1	10 YR 4/ 2	7.5YR 4/ 4
R6 R tubercule	10 YR 3/ 2	7.5YR 4/ 3	10 YR 3/ 2	7.5YR 3/ 2	10 YR 5/ 3	2.5YR 2/ 2	10 YR 5/ 2	7.5YR 4/ 3
R6 R lateral aspect of shaft	5 YR 6/ 2	10 YR 4/ 2	10 YR 5/ 2	10 YR 4/ 2	5 YR 7/ 1	N/A	2.5YR 5/ 3	10 YR 5/ 2
R6 R lateral aspect of shaft	10 YR 5/ 1	7.5YR 4/ 3	10 YR 7/ 2	10 YR 5/ 3	7.5YR 6/ 2	N 2.5	7.5YR 4/ 3	10 YR 5/ 1
R6 R lateral aspect of shaft	10 YR 5/ 2	10 YR 3/ 2	10 YR 5/ 4	10 YR 5/ 2	10 YR 6/ 1	N 4.5	10 YR 5/ 2	2.5Y 5/ 2
R6 R medial aspect of shaft	7.5YR 5/ 2	10 YR 4/ 2	10 YR 5/ 2	5 YR 3/ 3	7.5YR 6/ 2	N/A	10 YR 4/ 2	10 YR 5/ 2
R6 R medial aspect of shaft	10 YR 5/ 1	10 YR 5/ 3	10 YR 6/ 2	10 YR 6/ 2	7.5YR 5/ 3	N 2.5	2.5Y 6/ 1	10 YR 4/ 2
R6 R medial aspect of shaft	10 YR 3/ 2	7.5YR 3/ 2	10 YR 4/ 3	10 YR 5/ 3	10 YR 5/ 3	10 YR 3/ 1	10 YR 6/ 3	7.5YR 4/ 3
R6 R sternal end	2.5YR 2/ 2	10 YR 4/ 3	2.5Y 4/ 3	7.5YR 3/ 3	7.5YR 6/ 4	N 5.0	10 YR 4/ 2	5 YR 3/ 4
R7 R head	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 4/ 3	7.5YR 7/ 3	N/A	5 YR 3/ 6	7.5YR 5/ 4
R7 R tubercule	10 YR 4/ 2	5 YR 4/ 3	10 YR 5/ 2	10 YR 3/ 3	7.5YR 4/ 3	N/A	7.5YR 4/ 3	7.5YR 5/ 4
R7 R lateral aspect of shaft	5 YR 5/ 2	10 YR 4/ 2	7.5YR 6/ 2	7.5YR 5/ 3	10 YR 4/ 3	10 YR 3/ 2	10 YR 5/ 2	10 YR 5/ 1
R7 R lateral aspect of shaft	7.5YR 5/ 1	5 YR 3/ 2	7.5YR 6/ 2	7.5YR 3/ 3	7.5YR 7/ 2	5 YR 3/ 3	7.5YR 4/ 3	10 YR 6/ 2

RIGHT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R7 R lateral aspect of shaft	7.5YR 4/ 2	5 YR 4/ 1	5 Y 7/ 1	10 YR 5/ 2	7.5YR 4/ 3	2.5Y 2/ 1	10 YR 4/ 2	7.5YR 5/ 3
R7 R medial aspect of shaft	2.5Y 5/ 1	2.5Y 4/ 2	5 YR 4/ 2	10 YR 5/ 3	10 YR 6/ 2	2.5Y 4/ 1	10 YR 3/ 2	10 YR 4/ 2
R7 R medial aspect of shaft	7.5YR 5/ 2	7.5YR 3/ 2	10 YR 4/ 3	10 YR 6/ 3	7.5YR 5/ 3	10 YR 7/ 3	10 YR 3/ 3	10 YR 4/ 1
R7 R medial aspect of shaft	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 4/ 2	7.5YR 3/ 3	7.5YR 7/ 2	N 1.5	10 YR 5/ 2	10 YR 4/ 2
R7 R sternal end	5 YR 2/ 3	10 YR 4/ 3	10 YR 3/ 3	10 YR 3/ 3	7.5YR 5/ 4	N 1.5	10 YR 4/ 2	10 YR 3/ 4
R8 R head	10 YR 4/ 2	7.5YR 4/ 4	10 YR 4/ 2	7.5YR 3/ 3	7.5YR 5/ 3	N/A	10 YR 3/ 2	10 YR 4/ 4
R8 R tubercule	10 YR 5/ 2	10 YR 3/ 3	2.5Y 3/ 2	10 YR 4/ 2	10 YR 5/ 3	N/A	10 YR 3/ 3	7.5YR 4/ 3
R8 R lateral aspect of shaft	10 YR 6/ 2	10 YR 4/ 2	7.5YR 5/ 2	7.5YR 5/ 3	7.5YR 6/ 2	N/A	7.5YR 4/ 3	10 YR 5/ 1
R8 R lateral aspect of shaft	2.5Y 7/ 1	5 YR 3/ 2	10 YR 6/ 2	10 YR 5/ 3	10 YR 6/ 2	N/A	10 YR 6/ 2	10 YR 6/ 2
R8 R lateral aspect of shaft	7.5YR 3/ 1	10 YR 3/ 2	10 YR 5/ 3	10 YR 5/ 2	10 YR 5/ 2	2.5Y 5/ 1	10 YR 5/ 2	7.5YR 4/ 3
R8 R medial aspect of shaft	7.5YR 5/ 2	10 YR 5/ 3	7.5YR 4/ 2	2.5Y 6/ 2	7.5YR 7/ 2	N/A	7.5YR 3/ 2	10 Y 3/ 2
R8 R medial aspect of shaft	10 YR 6/ 2	10 YR 4/ 2	10 YR 6/ 2	10 YR 6/ 3	7.5YR 4/ 2	N/A	2.5Y 4/ 1	7.5YR 5/ 3
R8 R medial aspect of shaft	10 YR 3/ 2	7.5YR 4/ 3	10 YR 4/ 2	10 YR 6/ 2	2.5Y 5/ 2	N 5.0	7.5YR 3/ 1	7.5YR 3/ 3
R8 R sternal end	7.5YR 3/ 3	10 YR 4/ 3	7.5YR 2/ 3	7.5YR 4/ 3	10 YR 6/ 4	10 YR 4/ 2	10 YR 2/ 1	10 YR 3/ 4
R9 R head	10 YR 5/ 3	2.5Y 4/ 3	N/A	7.5YR 4/ 3	10 YR 6/ 2	7.5GY 2/ 1	7.5YR 3/ 2	10 YR 4/ 3
R9 R tubercule	2.5Y 5/ 2	7.5YR 4/ 3	N/A	10 YR 4/ 3	10 YR 5/ 1	N/A	2.5YR 3/ 4	7.5YR 4/ 3
R9 R lateral aspect of shaft	7.5YR 6/ 2	10 YR 3/ 3	N/A	7.5YR 4/ 3	7.5YR 5/ 3	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 6/ 2
R9 R lateral aspect of shaft	7.5YR 6/ 2	10 YR 2/ 2	N/A	7.5YR 5/ 3	7.5YR 6/ 2	7.5YR 3/ 1	2.5Y 5/ 2	7.5YR 6/ 2
R9 R lateral aspect of shaft	10 YR 4/ 2	10 YR 4/ 2	N/A	7.5YR 4/ 3	7.5YR 5/ 2	N/A	5 YR 4/ 2	7.5YR 5/ 3
R9 R medial aspect of shaft	7.5YR 6/ 2	10 YR 5/ 3	N/A	7.5YR 3/ 3	7.5YR 7/ 2	10 YR 6/ 3	10 YR 4/ 2	10 YR 5/ 1
R9 R medial aspect of shaft	7.5YR 4/ 3	5 YR 4/ 2	N/A	10 YR 5/ 3	10 YR 4/ 3	5 YR 2/ 2	7.5YR 3/ 3	10 YR 6/ 2
R9 R medial aspect of shaft	10 YR 3/ 2	10 YR 5/ 2	N/A	10 YR 3/ 2	10 YR 4/ 2	N/A	10 YR 5/ 2	2.5Y 5/ 1
R9 R sternal end	7.5YR 3/ 2	10 YR 3/ 2	N/A	7.5YR 4/ 3	10 YR 5/ 3	N/A	10 YR 5/ 2	10 YR 3/ 4
R10 R head	7.5YR 4/ 3	5 YR 3/ 1	N/A	10 YR 6/ 3	7.5YR 6/ 2	N/A	7.5YR 3/ 3	10 YR 5/ 3
R10 R tubercule	10 YR 4/ 3	10 YR 2/ 2	N/A	10 YR 5/ 2	10 YR 5/ 2	N/A	10 YR 4/ 3	2.5Y 4/ 3

RIGHT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R10 R lateral aspect of shaft	7.5YR 5/ 2	10 YR 5/ 2	N/A	7.5YR 4/ 4	7.5YR 5/ 3	10 R 5/ 6	7.5YR 4/ 3	7.5YR 6/ 2
R10 R lateral aspect of shaft	7.5YR 4/ 1	7.5YR 3/ 3	N/A	7.5YR 5/ 3	7.5YR 5/ 2	10 R 4/ 4	2.5Y 6/ 1	10 YR 6/ 2
R10 R lateral aspect of shaft	10 YR 4/ 2	10 YR 4/ 2	N/A	7.5YR 4/ 3	7.5YR 4/ 2	2.5YR 4/ 4	2.5Y 6/ 1	10 YR 4/ 2
R10 R medial aspect of shaft	2.5Y 5/ 1	10 YR 5/ 3	N/A	7.5YR 4/ 3	10 YR 6/ 2	7.5YR 7/ 2	10 YR 4/ 3	2.5Y 5/ 1
R10 R medial aspect of shaft	7.5YR 4/ 2	10 YR 6/ 2	N/A	10 YR 5/ 3	10 YR 4/ 2	10 YR 6/ 3	10 YR 5/ 2	10 YR 4/ 2
R10 R medial aspect of shaft	7.5YR 4/ 2	10 YR 4/ 2	N/A	7.5Y 4/ 3	10 YR 6/ 2	2.5Y 2/ 1	2.5Y 5/ 2	7.5YR 4/ 2
R10 R sternal end	7.5YR 4/ 3	10 YR 3/ 2	N/A	10 YR 4/ 3	7.5YR 6/ 4	N/A	10 YR 4/ 2	7.5YR 4/ 4
R11 R head	7.5YR 4/ 3	7.5YR 4/ 3	N/A	7.5YR 4/ 4	10 YR 4/ 3	N/A	7.5YR 3/ 3	7.5YR 4/ 3
R11 R tubercule	2.5Y 4/ 2	10 YR 4/ 3	N/A	5 YR 3/ 2	7.5YR 4/ 2	N/A	10 YR 4/ 3	10 YR 4/ 2
R11 R lateral aspect of shaft	10 YR 3/ 1	10 YR 4/ 2	N/A	10 YR 6/ 2	5 Y 5/ 1	7.5YR 4/ 3	10 YR 5/ 3	7.5YR 6/ 2
R11 R lateral aspect of shaft	7.5YR 7/ 3	10 YR 4/ 2	N/A	2.5Y 5/ 3	10 YR 5/ 2	7.5YR 4/ 4	10 YR 5/ 2	10 YR 6/ 2
R11 R lateral aspect of shaft	10 YR 4/ 2	10 YR 3/ 1	N/A	10 YR 6/ 3	10 YR 5/ 3	10 YR 2/ 1	10 YR 5/ 2	10 YR 4/ 2
R11 R medial aspect of shaft	10 YR 4/ 2	10 YR 5/ 2	N/A	5 Y 4/ 2	10 YR 5/ 2	10 YR 6/ 2	10 YR 5/ 2	2.5Y 4/ 1
R11 R medial aspect of shaft	10 YR 5/ 2	10 YR 6/ 3	N/A	7.5YR 5/ 3	10 YR 4/ 2	10 YR 5/ 4	10 YR 4/ 2	10 YR 3/ 1
R11 R medial aspect of shaft	7.5YR 4/ 1	10 R 3/ 1	N/A	10 YR 5/ 3	2.5Y 4/ 1	N/A	10 YR 4/ 2	10 YR 3/ 2
R11 R sternal end	7.5YR 3/ 2	7.5YR 3/ 3	N/A	10 YR 5/ 3	7.5YR 5/ 6	N/A	7.5YR 4/ 3	10 YR 4/ 3
R12 R head	10 YR 5/ 3	10 YR 4/ 3	N/A	10 YR 3/ 3	10 YR 5/ 2	7.5YR 5/ 3	7.5YR 2/ 3	7.5YR 5/ 3
R12 R tubercule	10 YR 5/ 2	10 YR 6/ 3	N/A	7.5YR 5/ 3	5 YR 5/ 2	2.5Y 5/ 1	7.5YR 4/ 3	10 YR 5/ 2
R12 R lateral aspect of shaft	7.5YR 6/ 2	5 YR 3/ 2	N/A	10 YR 6/ 3	10 YR 5/ 2	10 YR 4/ 2	10 YR 4/ 2	10 YR 6/ 2
R12 R lateral aspect of shaft	7.5YR 5/ 2	10 YR 4/ 2	N/A	10 YR 6/ 2	2.5Y 6/ 1	N 1.0	2.5Y 6/ 2	10 YR 6/ 2
R12 R lateral aspect of shaft	10 YR 5/ 2	7.5YR 4/ 3	N/A	2.5Y 7/ 2	7.5YR 5/ 2	10 YR 3/ 1	10 YR 5/ 2	10 YR 4/ 2
R12 R medial aspect of shaft	10 YR 5/ 2	7.5YR 2/ 2	N/A	7.5YR 4/ 2	2.5Y 5/ 2	N 1.5	7.5YR 4/ 3	5 YR 5/ 2
R12 R medial aspect of shaft	10 YR 3/ 1	10 YR 6/ 2	N/A	7.5YR 5/ 3	10 YR 4/ 2	N 3.5	2.5Y 5/ 2	10 YR 4/ 2
R12 R medial aspect of shaft	7.5YR 4/ 2	7.5YR 4/ 3	N/A	7.5YR 7/ 3	7.5YR 5/ 3	2.5RP 2/ 1	10 YR 4/ 3	10 YR 4/ 1
R12 R sternal end	5 YR 3/ 2	7.5YR 3/ 2	N/A	10 YR 6/ 3	10 YR 5/ 3	N/A	7.5YR 5/ 2	10 YR 3/ 2

RIGHT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R13 R head	7.5YR 5/ 4	10 YR 2/ 2	N/A	7.5YR 4/ 3	10 YR 6/ 2	10 G 4/ 3	7.5YR 5/ 2	7.5YR 6/ 3
R13 R tubercule	10 YR 5/ 2	7.5YR 3/ 2	N/A	10 YR 5/ 3	2.5Y 6/ 2	N/A	7.5YR 5/ 3	7.5YR 6/ 3
R13 R lateral aspect of shaft	7.5YR 5/ 2	10 YR 4/ 2	N/A	10 YR 5/ 2	2.5Y 6/ 1	N 2.0	7.5YR 5/ 3	10 YR 8/ 2
R13 R lateral aspect of shaft	5 YR 5/ 2	10 YR 4/ 3	N/A	10 YR 6/ 3	7.5YR 6/ 2	N 1.5	10 YR 5/ 2	10 YR 8/ 3
R13 R lateral aspect of shaft	7.5YR 4/ 1	7.5YR 4/ 3	N/A	10 YR 5/ 3	10 YR 6/ 2	N 2.0	10 YR 6/ 2	10 YR 6/ 3
R13 R medial aspect of shaft	10 YR 5/ 2	10 YR 4/ 2	N/A	10 YR 4/ 2	5 Y 5/ 1	N 1.0	7.5YR 6/ 3	10 YR 6/ 2
R13 R medial aspect of shaft	10 YR 5/ 2	10 YR 6/ 2	N/A	10 YR 5/ 3	7.5YR 5/ 2	7.5YR 4/ 1	7.5Y 4/ 1	10 YR 6/ 3
R13 R medial aspect of shaft	10 YR 4/ 2	10 YR 3/ 2	N/A	10 YR 6/ 2	7.5YR 6/ 3	2.5GY 2/ 1	10 YR 4/ 2	5 YR 4/ 2
R13 R sternal end	7.5YR 4/ 2	10 YR 3/ 3	N/A	10 YR 6/ 3	7.5YR 5/ 4	7.5YR 3/ 1	10 YR 4/ 3	10 YR 5/ 2
R14 R head	7.5YR 5/ 3	7.5YR 3/ 2	N/A	7.5YR 3/ 3	2.5Y 6/ 2	7.5YR 3/ 1	10 YR 5/ 3	10 YR 4/ 2
R14 R tubercule	10 YR 5/ 3	10 YR 5/ 3	N/A	N/A	10 YR 6/ 2	N 2.5	10 YR 5/ 3	2.5Y 4/ 2
R14 R lateral aspect of shaft	7.5YR 5/ 2	2.5Y 3/ 1	N/A	10 YR 5/ 2	2.5Y 6/ 1	5 GY 2/ 1	10 YR 5/ 2	2.5Y 8/ 2
R14 R lateral aspect of shaft	7.5YR 6/ 2	7.5YR 3/ 3	N/A	10 YR 6/ 3	10 YR 6/ 2	10 YR 3/ 1	7.5YR 4/ 3	10 YR 7/ 3
R14 R lateral aspect of shaft	7.5YR 3/ 2	10 YR 4/ 2	N/A	10 YR 5/ 3	10 YR 7/ 2	N/A	5 Y 5/ 1	10 YR 4/ 3
R14 R medial aspect of shaft	10 YR 5/ 2	10 YR 2/ 2	N/A	10 YR 5/ 2	7.5YR 5/ 1	N 2.5	10 YR 5/ 3	10 YR 6/ 3
R14 R medial aspect of shaft	7.5YR 4/ 3	10 YR 5/ 3	N/A	10 YR 4/ 2	7.5YR 5/ 3	10 B 5/ 1	10 YR 4/ 2	2.5Y 5/ 2
R14 R medial aspect of shaft	7.5YR 4/ 2	10 YR 2/ 2	N/A	7.5YR 5/ 2	7.5YR 6/ 3	2.5PB 5/ 2	7.5YR 5/ 3	10 YR 5/ 2
R14 R sternal end	10 YR 4/ 2	7.5YR 4/ 3	N/A	N/A	10 YR 5/ 3	N/A	7.5YR 4/ 3	7.5YR 5/ 3
R15 R head	10 YR 6/ 3	N/A	N/A	N/A	10 YR 4/ 3	10 YR 3/ 1	10 YR 4/ 2	N/A
R15 R tubercule	7.5YR 5/ 3	N/A	N/A	N/A	10 YR 4/ 3	5 GY 2/ 1	5 Y 4/ 2	N/A
R15 R lateral aspect of shaft	7.5YR 2/ 1	N/A	N/A	N/A	10 YR 7/ 3	N 2.5	2.5Y 5/ 2	N/A
R15 R lateral aspect of shaft	10 YR 5/ 1	N/A	N/A	N/A	7.5YR 6/ 2	N 2.5	5 Y 6/ 1	N/A
R15 R lateral aspect of shaft	7.5YR 4/ 1	N/A	N/A	N/A	10 YR 5/ 3	N/A	10 YR 5/ 2	N/A
R15 R medial aspect of shaft	10 YR 6/ 2	N/A	N/A	N/A	5 YR 4/ 2	10 YR 2/ 1	10 YR 4/ 2	N/A
R15 R medial aspect of shaft	10 YR 4/ 2	N/A	N/A	N/A	10 YR 5/ 2	N 5.5	7.5GY 4/ 2	N/A

RIGHT RIBS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
R15 R medial aspect of shaft	10 YR 4/ 2	N/A	N/A	N/A	7.5Y 4/ 1	N/A	2.5Y 3/ 2	N/A
R15 R sternal end	7.5YR 3/ 2	N/A	N/A	N/A	10 YR 4/ 2	N/A	10 YR 6/ 4	N/A
R16 R head	10 YR 5/ 3	N/A	N/A	N/A	N/A	5 YR 4/ 1	N/A	N/A
R16 R tubercule	10 YR 6/ 3	N/A	N/A	N/A	N/A	7.5YR 2/ 1	N/A	N/A
R16 R lateral aspect of shaft	7.5YR 5/ 2	N/A	N/A	N/A	N/A	10 YR 2/ 1	N/A	N/A
R16 R lateral aspect of shaft	10 YR 4/ 2	N/A	N/A	N/A	N/A	N 6.0	N/A	N/A
R16 R lateral aspect of shaft	10 YR 5/ 2	N/A	N/A	N/A	N/A	N 4.0	N/A	N/A
R16 R medial aspect of shaft	10 YR 6/ 2	N/A	N/A	N/A	N/A	10 YR 2/ 1	N/A	N/A
R16 R medial aspect of shaft	10 YR 4/ 2	N/A	N/A	N/A	N/A	N 6.5	N/A	N/A
R16 R medial aspect of shaft	10 YR 4/ 2	N/A	N/A	N/A	N/A	N 3.5	N/A	N/A
R16 R sternal end	7.5YR 3/ 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STERNEBRAE								
dorsal surface of segment one	10 YR 5/ 2	10 YR 5/ 3	10 YR 7/ 3	7.5YR 5/ 3	10 YR 7/ 2	7.5YR 2/ 1	10 YR 5/ 2	7.5YR 5/ 1
ventral surface of segment one	7.5YR 4/ 2	10 YR 3/ 2	7.5YR 5/ 2	10 YR 6/ 3	7.5YR 5/ 3	N 1.0	10 YR 5/ 3	10 YR 5/ 2
dorsal surface of segment two	5 Y 6/ 1	10 YR 5/ 4	10 YR 6/ 2	10 YR 4/ 3	10 YR 7/ 2	7.5YR 2/ 1	10 YR 5/ 2	10 YR 6/ 3
ventral surface of segment two	7.5YR 5/ 2	7.5YR 3/ 3	5 YR 4/ 1	10 YR 7/ 2	7.5YR 6/ 2	10 YR 2/ 2	10 YR 6/ 2	7.5YR 7/ 3
dorsal surface of segment three	7.5YR 5/ 2	10 YR 4/ 2	10 YR 6/ 2	7.5YR 3/ 2	2.5Y 6/ 3	7.5YR 2/ 3	10 YR 5/ 2	N/A
ventral surface of segment three	10 YR 5/ 2	7.5YR 3/ 3	7.5YR 5/ 1	10 YR 7/ 2	7.5YR 4/ 3	10 YR 6/ 2	10 YR 5/ 2	N/A
dorsal surface of segment four	7.5YR 4/ 2	10 YR 6/ 3	10 YR 5/ 3	10 YR 6/ 3	2.5Y 8/ 2	N/A	10 YR 5/ 2	N/A
ventral surface of segment four	10 YR 4/ 2	7.5YR 4/ 3	5 YR 4/ 1	2.5Y 8/ 2	7.5YR 4/ 3	N/A	10 YR 5/ 2	N/A
dorsal surface of segment five	10 YR 6/ 2	N/A	7.5YR 6/ 2	7.5YR 7/ 2	2.5Y 6/ 2	N/A	10 YR 5/ 2	N/A
ventral surface of segment five	10 YR 6/ 2	N/A	5 YR 4/ 2	7.5YR 4/ 2	7.5YR 4/ 3	N/A	10 YR 7/ 3	N/A
dorsal surface of segment six	10 YR 5/ 2	N/A	N/A	N/A	10 YR 7/ 4	N/A	7.5YR 5/ 3	N/A
ventral surface of segment six	2.5Y 5/ 2	N/A	N/A	N/A	7.5YR 5/ 4	N/A	2.5Y 6/ 1	N/A
dorsal surface of segment seven	N/A	N/A	N/A	N/A	10 YR 6/ 2	N/A	N/A	N/A

STERNEBRAE	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
ventral surface of segment seven	N/A	N/A	N/A	N/A	10 YR 3/ 3	N/A	N/A	N/A
LEFT CARPALS								
carpal1 side one	7.5YR 3/ 1	10 YR 7/ 3	10 YR 3/ 2	10 YR 7/ 3	10 YR 5/ 2	7.5YR 3/ 1	10 YR 5/ 2	7.5YR 7/ 3
carpal 1 side two	7.5YR 5/ 3	7.5YR 4/ 2	10 YR 3/ 3	7.5YR 3/ 1	10 YR 2/ 1	10 YR 5/ 3	7.5YR 4/ 3	7.5YR 5/ 3
carpal 2 side one	7.5YR 3/ 1	10 YR 2/ 1	10 YR 3/ 2	10 YR 7/ 2	7.5YR 5/ 2	7.5YR 3/ 2	2.5Y 6/ 2	10 YR 5/ 3
carpal 2 side two	2.5Y 5/ 1	10 YR 5/ 3	7.5YR 4/ 2	7.5YR 7/ 3	7.5YR 3/ 1	7.5YR 5/ 4	7.5YR 4/ 3	10 YR 5/ 4
carpal 3 side one	10 YR 2/ 1	2.5Y 4/ 3	10 YR 4/ 2	10 YR 2/ 1	10 YR 5/ 4	10 YR 2/ 1	7.5YR 4/ 3	10 YR 5/ 2
carpal 3side two	10 YR 4/ 2	10 YR 4/ 2	7.5YR 4/ 4	10 YR 3/ 2	10 YR 6/ 4	7.5YR 4/ 3	10 YR 5/ 2	7.5YR 5/ 3
carpal 4 side one	7.5YR 2/ 1	10 YR 2/ 1	7.5YR 5/ 3	10 YR 5/ 3	10 YR 5/ 2	5 YR 2/ 2	N/A	10 YR 5/ 2
carpal 4 side two	7.5YR 5/ 3	10 YR 4/ 3	7.5YR 4/ 2	10 YR 5/ 3	10 YR 2/ 1	10 YR 5/ 3	N/A	10 YR 6/ 3
carpal 5 side one	7.5YR 3/ 1	10 YR 5/ 3	7.5YR 4/ 2	7.5YR 6/ 4	7.5YR 5/ 3	10 YR 2/ 1	N/A	N/A
carpal 5 side two	7.5YR 4/ 3	10 YR 4/ 2	7.5YR 3/ 2	10 YR 6/ 2	10 YR 2/ 1	10 YR 6/ 3	N/A	N/A
carpal 6 side one	10 YR 3/ 2	7.5YR 4/ 3	10 YR 3/ 1	5 YR 2/ 2	7.5YR 3/ 3	10 YR 2/ 1	N/A	N/A
carpal 6 side two	7.5YR 4/ 3	10 YR 6/ 2	7.5YR 4/ 3	5 Y 7/ 1	7.5YR 3/ 1	7.5YR 7/ 3	N/A	N/A
carpal 7 side one	7.5YR 3/ 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
carpal 7 side two	10 YR 5/ 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LEFT Thoracic Limb								
phalange 2 dorsal aspect	N/A	7.5YR 5/ 3	10 YR 2/ 1	10 YR 4/ 2	10 YR 2/ 1	7.5YR 4/ 3	2.5Y 6/ 2	10 YR 7/ 3
phalange 2 volar aspect	N/A	7.5YR 4/ 3	7.5YR 3/ 1	10 YR 5/ 3	10 YR 2/ 1	10 YR 6/ 4	7.5YR 5/ 4	7.5YR 6/ 3
phalange 5 dorsal aspect	N/A	10 YR 4/ 2	10 YR 2/ 1	5 YR 3/ 2	7.5YR 5/ 3	N/A	N/A	7.5YR 6/ 2
phalange 5 volar aspect	N/A	10 YR 4/ 2	7.5YR 3/ 1	7.5YR 6/ 3	5 YR 2/ 2	N/A	N/A	10 YR 5/ 3
phalange 3-proximal dorsal aspect	10 YR 3/ 2	7.5YR 5/ 3	7.5YR 3/ 1	5 YR 3/ 1	10 YR 6/ 4	7.5YR 2/ 2	10 YR 3/ 2	7.5YR 5/ 3
phalange 3-proximal volar aspect	7.5YR 3/ 2	7.5YR 3/ 2	7.5YR 3/ 3	7.5YR 3/ 3	10 YR 4/ 3	7.5YR 6/ 2	10 YR 5/ 2	2.5Y 7/ 2
phalange 3-intermediate dorsal asp	7.5YR 3/ 1	7.5YR 3/ 3	7.5YR 3/ 1	7.5YR 5/ 2	10 YR 6/ 2	10 YR 5/ 4	10 YR 3/ 2	2.5Y 7/ 1
phalange3-intermediate volar asp	7.5YR 3/ 2	10 YR 6/ 2	7.5YR 3/ 2	10 YR 5/ 3	10 YR 2/ 1	10 YR 7/ 2	2.5Y 4/ 1	2.5Y 6/ 2

LEFT Thoracic Limb (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
phalange 3-distal dorsal aspect	7.5YR 3/ 3	7.5YR 4/ 3	7.5YR 3/ 2	10 YR 6/ 3	10 YR 3/ 2	7.5YR 4/ 4	2.5Y 4/ 1	7.5YR 7/ 2
phalange 3-distal volar aspect	7.5YR 3/ 2	10 YR 5/ 3	10 YR 2/ 1	10 YR 4/ 3	2.5Y 3/ 1	7.5YR 6/ 2	2.5Y 3/ 2	7.5YR 6/ 3
phalange 4-proximal dorsal aspect	7.5YR 3/ 2	10 YR 4/ 2	10 YR 2/ 1	7.5YR 3/ 2	7.5YR 6/ 3	7.5YR 3/ 1	N/A	7.5YR 7/ 1
phalange 4-proximal volar aspect	7.5YR 3/ 2	10 YR 6/ 3	10 YR 4/ 2	7.5YR 3/ 3	10 YR 2/ 2	10 YR 5/ 3	N/A	10 YR 6/ 2
phalange4-intermediate dorsal asp	5 YR 3/ 2	5 YR 4/ 3	7.5YR 3/ 1	10 YR 4/ 1	7.5YR 6/ 2	7.5YR 6/ 3	10 YR 4/ 2	N/A
phalange 4-intermediate volar asp	7.5YR 3/ 3	10 YR 3/ 2	7.5YR 4/ 3	7.5YR 5/ 2	10 YR 3/ 1	10 YR 4/ 3	2.5Y 5/ 2	N/A
phalange 4-distal dorsal aspect	7.5YR 3/ 2	10 YR 4/ 2	7.5YR 3/ 1	7.5YR 4/ 3	10 YR 5/ 2	7.5YR 3/ 2	N/A	10 YR 5/ 2
phalange 4-distal volar aspect	10 YR 4/ 3	10 YR 4/ 2	10 YR 3/ 2	10 YR 5/ 4	7.5YR 2/ 2	7.5YR 5/ 3	N/A	10 YR 6/ 3
RIGHT CARPALS								
carpal1 side one	7.5YR 4/ 4	7.5YR 5/ 4	7.5YR 5/ 2	7.5YR 3/ 2	7.5YR 7/ 3	N 3.0	7.5YR 3/ 2	7.5YR 4/ 2
carpal 1 side two	7.5YR 5/ 4	10 YR 5/ 3	10 YR 6/ 2	10 YR 7/ 2	7.5YR 5/ 3	7.5YR 8/ 2	7.5YR 5/ 2	7.5YR 4/ 3
carpal 2 side one	10 YR 4/ 2	7.5YR 4/ 3	10 YR 6/ 2	7.5YR 5/ 3	10 YR 7/ 4	10 YR 5/ 3	10 YR 7/ 4	10 YR 3/ 2
carpal 2 side two	7.5YR 5/ 4	7.5YR 3/ 2	10 YR 3/ 3	10 YR 6/ 4	10 YR 5/ 2	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 4/ 2
carpal 3 side one	7.5YR 4/ 3	7.5YR 3/ 3	10 YR 6/ 3	10 YR 5/ 2	7.5YR 3/ 3	7.5YR 6/ 3	7.5YR 4/ 4	7.5YR 4/ 2
RIGHT CARPALS (cont'd)								
carpal 3 side two	7.5YR 4/ 4	7.5YR 5/ 3	7.5YR 4/ 4	7.5YR 4/ 3	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 4/ 3	10 YR 5/ 4
carpal 4 side one	10 YR 4/ 3	10 YR 5/ 4	5 Y 7/ 1	10 YR 2/ 1	7.5YR 6/ 3	7.5YR 7/ 3	7.5YR 5/ 3	7.5YR 3/ 1
carpal 4 side two	7.5YR 4/ 4	5 YR 3/ 2	10 YR 5/ 3	10 YR 8/ 3	7.5YR 7/ 3	10 YR 8/ 2	10 YR 4/ 3	7.5YR 4/ 3
carpal 5 side one	10 YR 6/ 4	7.5YR 3/ 2	7.5YR 3/ 2	7.5YR 5/ 3	7.5YR 8/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 5/ 2
carpal 5 side two	7.5YR 4/ 4	10 YR 2/ 1	7.5YR 3/ 3	7.5YR 4/ 3	7.5YR 6/ 6	10 YR 2/ 1	7.5YR 5/ 4	10 YR 3/ 2
carpal 6 side one	10 YR 5/ 2	7.5YR 3/ 2	N/A	10 YR 4/ 2	N/A	7.5YR 7/ 2	10 YR 7/ 3	N/A
carpal 6 side two	10 YR 5/ 3	5 YR 3/ 2	N/A	7.5YR 4/ 3	N/A	7.5YR 4/ 2	7.5YR 4/ 3	N/A
carpal 7 side one	N/A	N/A	N/A	N/A	N/A	N/A	10 YR 5/ 3	N/A
carpal 7 side two	N/A	N/A	N/A	N/A	N/A	N/A	10 YR 5/ 3	N/A

Right Thoracic Limb	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
phalange 2 dorsal aspect	7.5YR 4/ 3	5 YR 2/ 2	10 YR 2/ 1	10 YR 7/ 2	7.5YR 6/ 3	7.5YR 4/ 4	10 YR 5/ 3	N/A
phalange 2 volar aspect	10 YR 2/ 2	7.5YR 3/ 2	7.5YR 5/ 3	10 YR 5/ 3	7.5YR 5/ 3	10 YR 5/ 4	10 YR 5/ 3	N/A
phalange 5 dorsal aspect	10 YR 6/ 2	N/A	7.5YR 3/ 2	7.5YR 5/ 3	7.5YR 6/ 3	10 YR 5/ 3	10 YR 6/ 4	N/A
phalange 5 volar aspect	10 YR 4/ 2	N/A	7.5YR 5/ 3	7.5YR 6/ 3	7.5YR 6/ 3	10 YR 6/ 2	7.5YR 3/ 3	N/A
phalange 3-proximal dorsal aspect	7.5YR 5/ 2	7.5YR 5/ 4	10 YR 6/ 3	10 YR 3/ 2	7.5YR 6/ 2	7.5YR 4/ 3	7.5YR 5/ 4	7.5YR 4/ 3
phalange 3-proximal volar aspect	7.5YR 5/ 2	5 YR 2/ 1	7.5YR 5/ 3	10 YR 6/ 2	10 YR 6/ 3	10 YR 7/ 2	7.5YR 5/ 4	10 YR 5/ 3
phalange 3-intermediate dorsal asp	7.5YR 5/ 3	10 YR 2/ 1	7.5YR 3/ 3	10 YR 6/ 3	7.5YR 5/ 3	10 YR 5/ 3	10 YR 5/ 2	7.5YR 3/ 2
phalange3-intermediate volar asp	2.5Y 5/ 2	10 YR 5/ 3	7.5YR 6/ 2	10 YR 2/ 2	10 YR 5/ 3	10 YR 6/ 2	7.5YR 6/ 4	10 YR 4/ 3
phalange 3-distal dorsal aspect	7.5YR 5/ 3	7.5YR 3/ 1	10 YR 6/ 3	N/A	10 YR 7/ 3	7.5YR 4/ 4	7.5YR 4/ 4	10 YR 5/ 3
phalange 3-distal volar aspect	10 YR 5/ 2	7.5YR 3/ 2	10 YR 4/ 2	N/A	7.5YR 5/ 4	10 YR 4/ 4	7.5YR 6/ 3	7.5YR 4/ 3
phalange 4-proximal dorsal aspect	10 YR 5/ 4	10 YR 2/ 1	2.5Y 8/ 1	10 YR 5/ 2	10 YR 6/ 3	5 YR 3/ 3	10 YR 6/ 2	7.5YR 3/ 1
phalange 4-proximal volar aspect	7.5YR 4/ 3	7.5YR 5/ 4	10 YR 2/ 1	10 YR 5/ 2	7.5YR 4/ 3	10 YR 4/ 1	10 YR 5/ 3	10 YR 6/ 3
phalange4-intermediate dorsal asp	7.5YR 5/ 3	N/A	7.5YR 3/ 2	7.5YR 2/ 2	7.5YR 4/ 3	10 YR 3/ 3	10 YR 6/ 3	10 YR 2/ 1
phalange 4-intermediate volar asp	10 YR 5/ 2	N/A	7.5YR 3/ 3	10 YR 4/ 2	7.5YR 6/ 3	10 YR 6/ 3	10 YR 5/ 3	10 YR 4/ 3
phalange 4-distal dorsal aspect	7.5YR 5/ 2	7.5YR 3/ 2	10 YR 5/ 4	N/A	7.5YR 5/ 3	N/A	N/A	10 YR 5/ 2
phalange 4-distal volar aspect	10 YR 6/ 2	7.5YR 3/ 2	7.5YR 3/ 3	N/A	10 YR 4/ 2	N/A	N/A	10 YR 4/ 3
LEFT TARSALS								
tarsal one side one	2.5Y 4/ 1	10 YR 5/ 3	7.5YR 3/ 1	2.5Y 7/ 2	N/A	7.5YR 3/ 2	10 YR 5/ 2	7.5YR 7/ 2
tarsal one side two	10 YR 3/ 3	10 YR 4/ 3	7.5YR 7/ 2	2.5Y 5/ 3	10 YR 5/ 3	7.5YR 6/ 3	7.5YR 4/ 3	10 YR 8/ 3
tarsal two side one	N 2.5	7.5Y 4/ 2	10 YR 7/ 3	5 YR 2/ 1	N/A	7.5YR 3/ 1	2.5Y 6/ 2	7.5YR 6/ 3
tarsal two side two	7.5YR 4/ 4	10 YR 5/ 4	5 YR 2/ 2	10 YR 6/ 3	7.5YR 3/ 3	10 YR 4/ 4	7.5YR 4/ 3	7.5YR 5/ 2
tarsal three side one	7.5YR 5/ 4	10 YR 3/ 3	7.5YR 3/ 2	7.5YR 6/ 4	10 YR 2/ 1	2.5Y 4/ 2	N/A	N/A
tarsal three side two	7.5YR 5/ 3	7.5YR 4/ 4	7.5YR 5/ 1	7.5YR 4/ 3	2.5Y 4/ 3	10 YR 5/ 4	N/A	N/A
tarsal four side one	N/A	7.5YR 3/ 3	7.5YR 3/ 1	7.5YR 3/ 2	N/A	N/A	N/A	N/A
tarsal four side two	N/A	7.5YR 3/ 3	10 YR 5/ 4	10 YR 2/ 1	N/A	N/A	N/A	N/A

LEFT PES	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
phalange 2 dorsal aspect	7.5YR 4/ 3	7.5YR 4/ 4	10 YR 6/ 2	7.5Y 2/ 1	10 YR 3/ 2	7.5YR 5/ 3	7.5YR 4/ 3	10 YR 5/ 2
phalange 2 volar aspect	10 YR 3/ 2	10 YR 5/ 3	7.5YR 4/ 4	7.5YR 7/ 3	7.5YR 4/ 4	7.5YR 5/ 2	10 YR 5/ 2	7.5YR 6/ 2
phalange 5 dorsal aspect	10 YR 5/ 3	N/A	N/A	7.5YR 4/ 4	2.5Y 3/ 1	10 YR 5/ 3	7.5YR 3/ 2	2.5Y 6/ 1
phalange 5 volar aspect	10 YR 3/ 2	N/A	N/A	2.5Y 2/ 1	7.5YR 3/ 2	7.5YR 4/ 4	7.5YR 5/ 2	10 YR 5/ 3
phalange 3-proximal dorsal aspect	10 YR 6/ 3	7.5YR 3/ 3	7.5YR 4/ 3	7.5YR 3/ 1	7.5YR 7/ 2	7.5YR 4/ 4	10 YR 7/ 4	2.5Y 7/ 3
phalange 3-proximal volar aspect	7.5YR 3/ 2	10 YR 5/ 3	10 YR 5/ 2	10 YR 6/ 2	10 YR 3/ 2	7.5YR 5/ 2	7.5YR 4/ 4	10 YR 6/ 2
phalange 3-intermediate dorsal asp	10 YR 4/ 2	7.5YR 6/ 4	7.5YR 3/ 3	10 YR 4/ 2	10 YR 4/ 3	N/A	7.5YR 4/ 4	10 YR 5/ 3
phalange3-intermediate volar asp	10 YR 5/ 3	10 YR 5/ 4	10 YR 6/ 2	10 YR 6/ 4	10 YR 5/ 3	N/A	10 YR 4/ 3	10 YR 6/ 4
phalange 3-distal dorsal aspect	7.5YR 6/ 2	10 YR 3/ 3	10 YR 6/ 3	10 YR 5/ 4	10 YR 6/ 2	N/A	7.5YR 5/ 3	N/A
phalange 3-distal volar aspect	7.5YR 3/ 2	7.5YR 3/ 2	7.5YR 3/ 2	10 YR 7/ 2	10 YR 3/ 2	N/A	10 YR 4/ 3	N/A
phalange 4-proximal dorsal aspect	10 YR 5/ 3	7.5YR 3/ 3	10 YR 5/ 2	7.5YR 4/ 2	7.5YR 4/ 3	N/A	10 YR 4/ 2	7.5YR 5/ 2
phalange 4-proximal volar aspect	10 YR 6/ 3	10 YR 5/ 3	10 YR 6/ 4	2.5Y 7/ 2	10 YR 6/ 2	N/A	7.5YR 5/ 4	10 YR 5/ 2
phalange4-intermediate dorsal asp	10 YR 6/ 2	10 YR 6/ 3	10 YR 4/ 2	10 YR 5/ 3	7.5YR 2/ 2	N/A	10 YR 7/ 3	7.5YR 5/ 4
phalange 4-intermediate volar asp	10 YR 6/ 2	10 YR 5/ 3	5 YR 4/ 3	10 YR 4/ 3	10 YR 5/ 2	N/A	7.5YR 4/ 3	10 YR 5/ 2
phalange 4-distal dorsal aspect	2.5Y 5/ 2	7.5YR 6/ 3	2.5Y 5/ 3	7.5YR 4/ 3	10 YR 6/ 3	N/A	10 YR 5/ 3	N/A
phalange 4-distal volar aspect	2.5Y 6/ 3	7.5YR 4/ 4	10 YR 5/ 4	10 YR 6/ 3	10 YR 6/ 2	N/A	10 YR 5/ 3	N/A
RIGHT TARSALS								
tarsal one side one	7.5YR 3/ 2	10 YR 2/ 1	10 YR 4/ 3	7.5YR 3/ 3	10 YR 2/ 1	2.5Y 4/ 2	2.5Y 6/ 2	N 2.5
tarsal one side two	10 YR 3/ 4	7.5YR 4/ 3	7.5YR 6/ 2	7.5YR 5/ 3	2.5Y 3/ 1	7.5YR 5/ 4	7.5YR 5/ 4	N 3.5
tarsal two side one	7.5YR 3/ 4	10 YR 4/ 4	10 YR 6/ 3	10 YR 7/ 3	10 YR 5/ 3	7.5YR 3/ 2	10 YR 3/ 2	7.5YR 5/ 1
tarsal two side two	10 YR 5/ 3	7.5YR 5/ 3	10 YR 5/ 3	7.5YR 6/ 3	7.5YR 3/ 3	10 YR 5/ 2	10 YR 5/ 2	N 5.0
tarsal three side one	7.5YR 5/ 3	10 YR 5/ 2	10 YR 5/ 2	7.5YR 6/ 3	10 YR 5/ 3	7.5YR 4/ 2	10 YR 3/ 2	7.5YR 6/ 2
tarsal three side two	7.5YR 4/ 3	10 YR 4/ 3	10 YR 5/ 2	10 YR 4/ 3	10 YR 4/ 2	10 YR 5/ 4	2.5Y 4/ 1	10 YR 4/ 3
tarsal four side one	10 YR 5/ 4	10 YR 4/ 2	N/A	7.5YR 6/ 3	10 YR 5/ 2	N/A	N/A	2.5Y 5/ 2
tarsal four side two	10 YR 5/ 4	7.5YR 3/ 2	N/A	7.5YR 6/ 4	10 YR 6/ 4	N/A	N/A	N 2.0

RIGHT TARSALS (cont'd)	Pig #1	Pig #2	Pig #3	Pig # 4	Pig #5	Pig #6	Pig #7	Pig #8
tarsal five side one	N/A	N/A	N/A	N/A	10 YR 5/ 3	N/A	N/A	N/A
tarsal five side two	N/A	N/A	N/A	N/A	5 YR 2/ 2	N/A	N/A	N/A
RIGHT PES								
phalange 2 dorsal aspect	7.5YR 3/ 3	7.5YR 3/ 3	10 YR 7/ 3	10 YR 2/ 2	7.5YR 4/ 3	2.5Y 2/ 2	2.5Y 4/ 1	7.5YR 4/ 2
phalange 2 volar aspect	7.5YR 4/ 4	10 YR 4/ 3	7.5YR 3/ 1	7.5YR 2/ 2	7.5YR 6/ 3	10 YR 3/ 2	2.5Y 3/ 2	10 YR 4/ 2
phalange 5 dorsal aspect	N/A	10 YR 5/ 3	2.5Y 6/ 2	10 YR 7/ 2	10 YR 2/ 1	7.5YR 2/ 3	N/A	N/A
phalange 5 volar aspect	N/A	7.5YR 5/ 4	5 YR 3/ 2	7.5YR 7/ 3	10 YR 2/ 2	10 YR 4/ 3	N/A	N/A
phalange 3-proximal dorsal aspect	10 YR 5/ 3	7.5YR 4/ 3	10 YR 7/ 2	10 YR 7/ 3	10 YR 7/ 2	10 YR 4/ 2	10 YR 4/ 2	7.5YR 3/ 1
phalange 3-proximal volar aspect	7.5YR 4/ 3	2.5Y 6/ 2	7.5YR 2/ 1	10 YR 6/ 2	7.5YR 3/ 2	7.5YR 4/ 3	2.5Y 5/ 2	10 YR 6/ 3
phalange 3-intermediate dorsal asp	10 YR 5/ 3	7.5YR 3/ 3	10 YR 6/ 2	7.5YR 3/ 2	10 YR 5/ 2	7.5YR 2/ 3	10 YR 5/ 3	7.5YR 4/ 3
phalange3-intermediate volar asp	10 YR 5/ 4	7.5YR 4/ 4	7.5YR 4/ 1	2.5Y 6/ 3	7.5YR 3/ 2	7.5YR 5/ 3	10 YR 5/ 3	10 YR 4/ 2
phalange 3-distal dorsal aspect	10 YR 5/ 3	10 YR 4/ 3	10 YR 6/ 3	7.5YR 6/ 3	10 YR 5/ 3	10 YR 3/ 3	N/A	7.5YR 4/ 3
phalange 3-distal volar aspect	5 YR 4/ 3	10 YR 6/ 2	7.5YR 4/ 4	10 YR 6/ 2	7.5YR 3/ 3	10 YR 6/ 3	N/A	7.5YR 4/ 3
phalange 4-proximal dorsal aspect	10 YR 6/ 3	7.5YR 3/ 3	7.5YR 3/ 2	5 YR 2/ 2	10 YR 6/ 3	5 Y 2/ 1	10 YR 6/ 4	7.5YR 4/ 3
phalange 4-proximal volar aspect	7.5YR 3/ 3	2.5Y 6/ 3	10 YR 7/ 3	10 YR 5/ 3	10 YR 3/ 3	10 YR 4/ 3	7.5YR 3/ 3	10 YR 5/ 3
phalange4-intermediate dorsal asp	10 YR 6/ 2	10 YR 6/ 4	7.5YR 5/ 3	7.5YR 4/ 4	10 YR 5/ 3	10 YR 3/ 3	7.5YR 5/ 4	7.5YR 3/ 2
phalange 4-intermediate volar asp	10 YR 5/ 4	7.5YR 4/ 3	7.5YR 4/ 3	10 YR 5/ 4	10 YR 3/ 2	10 YR 6/ 2	7.5YR 5/ 4	7.5YR 4/ 4
phalange 4-distal dorsal aspect	N/A	7.5YR 3/ 2	N/A	10 YR 6/ 3	10 YR 5/ 4	7.5YR 2/ 2	N/A	10 YR 5/ 4
phalange 4-distal volar aspect	N/A	7.5YR 2/ 2	N/A	7.5YR 4/ 4	10 YR 5/ 3	7.5YR 3/ 3	N/A	10 YR 5/ 3

APPENDIX D:

A Step-by-Step Example of How Colour Matches were Made during the Colour Analysis

An example using the first yellow tagged Munsell colour reading of pig #6 (7.5 YR 3/3):

1) The yellow Munsell colour reading is copied and pasted into the "find" tool in Windows Excel.

Cranium	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
LEFT Lateral View								
Occipital Bone			10 YR 5/ 2	10 YR 7/ 3		7.5YR 3/ 3		
Occipital Bone			10 YR 4/ 3	7.5YR 6/ 2		10 YR 2/ 2		
Occipital Bone			10 YR 5/ 2	7.5YR 4/ 3		7.5YR 2/ 2		
Occipital Bone			5 YR 5/ 2	10 YR 3/ 3		7.5YR 2/ 3		
Occipital Bone			7.5YR 3/ 2	N/A		10 YR 6/ 2		
Occipital condyle			7.5YR 7/ 3	10 YR 6/ 3		N 1.5		
Occipital condyle			7.5YR 5/ 3	N/A		7.5YR 3/ 3		
nuchal crest			7.5YR 2/ 2	2.5Y 3/ 2				
nuchal crest			7.5YR 3/ 3	10 YR 4/ 2				
nuchal crest			10 YR 4/ 2	10 YR 5/ 3				
paramastoid process			2.5Y 6/ 2	N/A				7.5YR 5/ 3
paramastoid process			10 YR 5/ 2	10 YR 7/ 3	N/A			7.5YR 5/ 1

2) It is then searched against all of the blue and green Munsell colour readings of "control" pig paired group, pigs #1 and #2 for any matching Munsell colour readings, regardless of its current colour tag.

Cranium	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
LEFT Lateral View								
Occipital Bone			10 YR 5/ 2	10 YR 7/ 3		7.5YR 3/ 3		
Occipital Bone			10 YR 4/ 3	7.5YR 6/ 2		10 YR 2/ 2		
Occipital Bone			10 YR 5/ 2	7.5YR 4/ 3		7.5YR 2/ 2		
Occipital Bone			5 YR 5/ 2	10 YR 3/ 3		7.5YR 2/ 3		
Occipital Bone			7.5YR 3/ 2	N/A		10 YR 6/ 2		
Occipital condyle			7.5YR 7/ 3	10 YR 6/ 3		N 1.5		
Occipital condyle			7.5YR 5/ 3	N/A		7.5YR 3/ 3		
nuchal crest			7.5YR 2/ 2	2.5Y 3/ 2				
nuchal crest			7.5YR 3/ 3	10 YR 4/ 2				
nuchal crest			10 YR 4/ 2	10 YR 5/ 3				
paramastoid process			2.5Y 6/ 2	N/A				7.5YR 5/ 3
paramastoid process			10 YR 5/ 2	10 YR 7/ 3	N/A			7.5YR 5/ 1

3) If a match is identified, it is reassigned a new colour tag to reflect the type of staining present. Ie. a red colour tag represents dark staining versus a purple colour tag represents a light staining.

Cranium	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
LEFT Lateral View								
Occipital Bone			10 YR 5/ 2	10 YR 7/ 3		7.5YR 3/ 3		
Occipital Bone			10 YR 4/ 3	7.5YR 6/ 2		10 YR 2/ 2		
Occipital Bone			10 YR 5/ 2	7.5YR 4/ 3		7.5YR 2/ 2		
Occipital Bone			5 YR 5/ 2	10 YR 3/ 3		7.5YR 2/ 3		
Occipital Bone			7.5YR 3/ 2	N/A		10 YR 6/ 2		
Occipital condyle			7.5YR 7/ 3	10 YR 6/ 3		N 1.5		
Occipital condyle			7.5YR 5/ 3	N/A		7.5YR 3/ 3		
nuchal crest			7.5YR 2/ 2	2.5Y 3/ 2				
nuchal crest			7.5YR 3/ 3	10 YR 4/ 2				
nuchal crest			10 YR 4/ 2	10 YR 5/ 3				
paramastoid process			2.5Y 6/ 2	N/A				7.5YR 5/ 3
paramastoid process			10 YR 5/ 2	10 YR 7/ 3	N/A			7.5YR 5/ 1

4) The total number of matches made by this individual tagged Munsell colour reading from the "advanced decomposition" pig paired group was then tabulated to determine the frequency of how many colour matches it made against the control group.

5) The same process was repeated for each and every single yellow tagged Munsell colour reading from the "advanced decomposition" pig paired group, pigs #7 and #8, and the "skeletonization" pig paired group, pigs #5 and #6.

APPENDIX E:

Manipulated Munsell Colour Reading Data

	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
CRANIUM LEFT Lateral View								
Occipital Bone			10 YR 5/ 2	10 YR 7/ 3		7.5YR 3/ 3		
Occipital Bone			10 YR 4/ 3	7.5YR 6/ 2		10 YR 2/ 2		
Occipital Bone			10 YR 5/ 2	7.5YR 4/ 3		7.5YR 2/ 2		
Occipital Bone			5 YR 5/ 2	10 YR 3/ 3		7.5YR 2/ 3		
Occipital Bone			7.5YR 3/ 2	N/A		10 YR 6/ 2		
Occipital condyle			7.5YR 7/ 3	10 YR 6/ 3		N 1.5		
Occipital condyle			7.5YR 5/ 3	N/A		7.5YR 3/ 3		
nuchal crest			7.5YR 2/ 2	2.5Y 3/ 2				
nuchal crest			7.5YR 3/ 3	10 YR 4/ 2				
nuchal crest			10 YR 4/ 2	10 YR 5/ 3				
paramastoid process			2.5Y 6/ 2	N/A				7.5YR 5/ 3
paramastoid process			10 YR 5/ 2	10 YR 7/ 3	N/A			7.5YR 5/ 1
zygomatic process of temporal bone			10 YR 4/ 4	5 YR 3/ 2	10 YR 4/ 2			N 4.0
zygomatic process of temporal bone			10 YR 5/ 4	5 YR 3/ 4	10 YR 4/ 2			2.5Y 2/ 1
zygomatic process of temporal bone			7.5YR 4/ 4	10 YR 5/ 3	10 YR 3/ 2			10 YR 3/ 1
external acoustic meatus			5 Y 3/ 2	7.5YR 2/ 3	2.5Y 3/ 1	10 YR 2/ 1		N 1.0
parietal bone			10 YR 4/ 3	10 YR 6/ 3	10 YR 4/ 2	10 YR 3/ 3		10 YR 5/ 2
parietal bone			10 YR 2/ 1	2.5Y 5/ 2	7.5YR 4/ 3	7.5YR 4/ 3		7.5YR 2/ 2
parietal bone			7.5YR 4/ 3	2.5Y 4/ 2	10 YR 4/ 3	10 YR 4/ 2		5 YR 5/ 2
parietal crest			10 YR 4/ 3	10 YR 4/ 2	7.5YR 2/ 2			2.5Y 4/ 1
parietal crest			10 YR 3/ 2	2.5Y 5/ 2	7.5YR 3/ 2			10 YR 4/ 2
parietal crest			2.5Y 4/ 2	10 YR 4/ 2	7.5YR 3/ 2			7.5YR 5/ 1
supraorbital process			10 YR 6/ 3	7.5YR 4/ 3	7.5YR 3/ 2			N 1.5
supraorbital foramen and groove			10 YR 3/ 2	2.5Y 5/ 3	N/A	10 YR 2/ 2		10 YR 3/ 1

CRANIUM LEFT Lateral View (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
infraorbital foramen			2.5Y 4/ 2	10 YR 2/ 2		7.5Y 4/ 1		10 YR 3/ 2
frontal bone			10 YR 4/ 2	10 YR 6/ 3		7.5YR 3/ 2		7.5R 5/ 3
frontal bone			10 YR 3/ 2	10 YR 5/ 3		10 YR 3/ 2		N 2.0
frontal bone			7.5YR 2/ 2	10 YR 2/ 2		7.5YR 2/ 2		2.5Y 3/ 1
lacrimal bone			10 YR 2/ 2	10 YR 2/ 2	10 YR 3/ 2			N 1.5
malar bone			7.5YR 5/ 4	7.5YR 4/ 4				10 YR 3/ 1
malar bone			7.5YR 4/ 3	5 Y 6/ 2				N 2.0
zygomatic process of malar bone			7.5YR 5/ 4	10 YR 5/ 4				N 2.0
zygomatic process of malar bone			10 YR 6/ 4	7.5YR 5/ 4				N 2.5
zygomatic process of malar bone			10 YR 6/ 4	10 YR 5/ 3				N 3.5
Maxilla			N 1.0	7.5YR 2/ 2				10 YR 5/ 3
Maxilla			10 YR 6/ 2	7.5YR 2/ 2				
Maxilla			10 YR 4/ 2	7.5YR 3/ 2				
Maxilla			2.5Y 5/ 2	10 YR 3/ 2		10 YR 3/ 2		
Maxilla			10 YR 3/ 2	7.5YR 4/ 4		N 1.5		
Premaxilla	N/A		10 YR 5/ 3	5 YR 3/ 3		7.5GY 2/ 1		
Premaxilla	N/A		7.5YR 4/ 4	10 YR 5/ 4		2.5Y 4/ 2		
palatine bone			7.5YR 2/ 2	2.5Y 5/ 1		10 YR 2/ 2		
palatine bone			2.5Y 3/ 2	10 YR 4/ 2		7.5YR 2/ 3		
palatine bone			10 YR 4/ 2	7.5YR 5/ 3		7.5YR 2/ 2		
nasal bone			7.5YR 2/ 2	7.5YR 4/ 3		7.5YR 3/ 2		
nasal bone			5 YR 2/ 2	5 YR 2/ 2		7.5YR 3/ 2		
nasal bone			7.5YR 4/ 3	2.5GY 4/ 3		7.5YR 3/ 3		
nasal bone			7.5YR 4/ 3	7.5YR 4/ 3		7.5YR 2/ 1		
condyle of mandible			10 YR 4/ 3	7.5YR 4/ 3		N/A		

CRANIUM LEFT Lateral View (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
mental prominence			10 YR 5/ 2	2.5Y 5/ 1				
angle of mandible			7.5YR 2/ 3	7.5R 2/ 2				N 2.5
angle of mandible			7.5YR 4/ 3	7.5YR 5/ 4				10 YR 2/ 1
angle of mandible			10 YR 3/ 4	7.5YR 5/ 3				N 1.0
horizontal part of ramus			7.5YR 3/ 2	7.5YR 4/ 4				
horizontal part of ramus			7.5YR 4/ 4	10 YR 5/ 3				
horizontal part of ramus			5 YR 3/ 3	7.5YR 6/ 3				10 YR 2/ 1
horizontal part of ramus			7.5YR 3/ 3	7.5YR 6/ 3				2.5Y 2/ 1
vertical part of ramus			10 YR 3/ 3	5 YR 4/ 3				N 1.5
vertical part of ramus			7.5YR 4/ 3	10 YR 3/ 2				N 3.0
vertical part of ramus			7.5YR 4/ 3	10 YR 5/ 3				N 3.0
vertical part of ramus			7.5YR 4/ 3	7.5YR 5/ 4				N 2.0
coronoid process			7.5YR 3/ 2	10 YR 5/ 2		2.5Y 5/ 2		N 7.5
coronoid process			7.5YR 3/ 3	10 YR 4/ 2		7.5YR 3/ 2		10 YR 7/ 1
CRANIUM RIGHT Lateral View								
zygomatic process of temporal bone			10 YR 2/ 2	7.5YR 5/ 3				
zygomatic process of temporal bone			7.5YR 4/ 3	7.5YR 4/ 3				
zygomatic process of temporal bone			7.5YR 5/ 3	10 YR 4/ 2				
external acoustic meatus			10 YR 2/ 2	10 YR 4/ 2				
parietal bone			7.5YR 4/ 2	10 YR 5/ 4				
parietal bone			10 YR 3/ 2	10 YR 5/ 3				
parietal bone			10 YR 3/ 2	5 Y 5/ 2				
parietal crest			10 YR 3/ 2	10 YR 6/ 3				
parietal crest			7.5YR 3/ 1	10 YR 6/ 3				
parietal crest			7.5YR 2/ 2	10 YR 6/ 3				

CRANIUM RIGHT Lateral View (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
supraorbital process			7.5YR 2/ 2	7.5YR 2/ 2				
supraorbital foramen and groove			7.5YR 2/ 2	7.5YR 4/ 3				
infraorbital foramen			7.5YR 2/ 2	2.5Y 3/ 2				
frontal bone			5 YR 2/ 2	7.5YR 4/ 3				
frontal bone			10 YR 3/ 2	10 YR 4/ 3				
frontal bone			7.5YR 2/ 2	7.5YR 3/ 2				
lacrimal bone			7.5YR 2/ 2	7.5YR 4/ 2				
malar bone			7.5YR 4/ 3	10 YR 6/ 2				
malar bone			7.5YR 4/ 3	10 YR 7/ 2				
zygomatic process of malar bone			10 YR 6/ 3	7.5YR 7/ 2				
zygomatic process of malar bone			7.5YR 5/ 3	10 YR 6/ 2				
zygomatic process of malar bone			10 YR 5/ 3	10 YR 5/ 2				
Maxilla			10 YR 3/ 2	7.5YR 4/ 2				
Maxilla			7.5YR 2/ 2	7.5YR 5/ 2				
Maxilla			5 Y 5/ 1	2.5Y 5/ 1				
Maxilla			10 YR 3/ 2	10 YR 5/ 2				
Maxilla			10 YR 4/ 2	5 YR 4/ 2				
Premaxilla			10 YR 4/ 2	10 YR 5/ 3				
Premaxilla			7.5YR 3/ 2	10 YR 6/ 3				
Premaxilla			7.5YR 3/ 2	10 YR 7/ 2				
palatine bone			10 YR 3/ 2	10 YR 4/ 2				
palatine bone			2.5Y 2/ 1	10 YR 4/ 2				
palatine bone			7.5YR 3/ 2	10 YR 3/ 2				
nasal bone			10 YR 3/ 2	7.5YR 3/ 2				
nasal bone			10 YR 3/ 2	7.5YR 3/ 1				

CRANIUM RIGHT Lateral View (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
nasal bone			7.5YR 3/ 3	5 YR 2/ 2				
nasal bone			10 YR 3/ 2	10 YR 4/ 2				
condyle of mandible			10 YR 5/ 3	10 YR 5/ 3		7.5YR 4/ 3		
angle of mandible			7.5YR 3/ 2	10 YR 6/ 2	10 YR 3/ 2			
angle of mandible			7.5YR 3/ 2	10 YR 6/ 2	10 YR 3/ 2			
angle of mandible			7.5YR 4/ 3	10 YR 5/ 2	10 YR 4/ 2			
body of mandible (dorsal view)			7.5YR 3/ 3	7.5YR 4/ 3	N/A	N/A		
body of mandible (dorsal view)			7.5YR 3/ 2	7.5YR 3/ 3	N/A	N/A		
body of mandible (dorsal view)			10 YR 2/ 2	10 YR 3/ 2	N/A	N/A		
horizontal part of ramus			10 YR 2/ 1	7.5YR 5/ 3	10 YR 5/ 2			
horizontal part of ramus			7.5YR 3/ 1	7.5YR 5/ 2	7.5YR 4/ 3			
horizontal part of ramus			10 YR 3/ 2	7.5YR 7/ 1	10 YR 4/ 2			
horizontal part of ramus			5 YR 2/ 2	10 YR 6/ 2	10 YR 5/ 2			
vertical part of ramus			7.5YR 3/ 2	10 YR 6/ 2	10 YR 4/ 2			
vertical part of ramus			7.5YR 3/ 2	7.5YR 6/ 2	7.5YR 4/ 2			
vertical part of ramus			7.5YR 3/ 2	2.5Y 7/ 1	10 YR 3/ 2			
vertical part of ramus			7.5YR 3/ 3	7.5YR 6/ 2	10 YR 4/ 2			
coronoid process			5 YR 2/ 2	7.5YR 5/ 3				
coronoid process			7.5YR 3/ 1	10 YR 5/ 3				
LEFT SCAPULA Lateral View								
SL spine			10 YR 3/ 3	10 YR 4/ 2		10 YR 3/ 1		
SL spine			10 YR 4/ 3	10 YR 4/ 2		N 1.5		
SL tuber spinae			10 YR 7/ 4	10 YR 4/ 2		2.5Y 2/ 1		
SL acromion			10 YR 4/ 2	7.5YR 5/ 3		7.5YR 4/ 2		
SL supraspinous fossa			10 YR 4/ 2	10 YR 4/ 3		N 1.5		

LEFT SCAPULA Lateral View (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
SL supraspinous fossa			10 YR 3/ 2	10 YR 3/ 3		N 1.0		
SL supraspinous fossa			10 YR 4/ 2	10 YR 2/ 2		N 1.5		
SL infraspinous fossa			10 Y 3/ 1	2.5Y 3/ 2		N 1.0		
SL infraspinous fossa			5 Y 2/ 2	10 YR 2/ 2		N 1.5		
SL infraspinous fossa			7.5Y 4/ 1	7.5YR 4/ 2		N 2.0		
SL infraspinous fossa			2.5Y 6/ 1	10 YR 5/ 2		N 1.0		
SL neck			7.5YR 6/ 2	7.5YR 4/ 2				
SL neck			7.5YR 6/ 2	10 YR 4/ 2				
SL tuber scapulae			N/A	7.5YR 3/ 2		2.5Y 2/ 1		
SL glenoid cavity			N/A	7.5YR 3/ 2		10 YR 4/ 2		
SL glenoid cavity			7.5YR 5/ 3	7.5YR 2/ 3		7.5YR 4/ 2		
SL anterior border			10 YR 6/ 3	10 YR 4/ 2		N 1.5		
SL anterior border			7.5YR 4/ 4	7.5YR 5/ 3		N 1.5		
SL anterior border			7.5YR 4/ 3	5 Y 6/ 1		2.5Y 3/ 1		
SL anterior angle			10 YR 5/ 2	10 YR 6/ 3		N/A		
SL posterior border			10 YR 5/ 2	7.5YR 3/ 3		N 2.0		
SL posterior border			7.5YR 7/ 3	7.5YR 5/ 3		2.5Y 2/ 1		
SL posterior border			2.5Y 7/ 3	7.5YR 6/ 2		N 2.5		
SL posterior angle			10 YR 6/ 3	7.5YR 6/ 3		10 YR 3/ 1		
LEFT SCAPULA Medial View								
SL subscapular fossa			10 YR 6/ 3	10 YR 5/ 3		N 2.5		
SL subscapular fossa			10 YR 6/ 3	7.5YR 3/ 3		N 2.5		
SL subscapular fossa			2.5Y 5/ 2	7.5YR 4/ 3		N 3.0		
SL subscapular fossa			10 YR 4/ 2	7.5YR 4/ 3				
SL subscapular fossa			7.5YR 4/ 3	2.5Y 4/ 2				

LEFT SCAPULA Medial View	**pig 1**	**pig 2**	**pig3**	**pig 4**	**pig5**	**pig6**	**pig7**	**pig8**
SL serratus area			7.5YR 5/ 2	10 YR 5/ 3		10 YR 3/ 1		
SL serratus area			10 YR 5/ 2	5 YR 4/ 3		N 3.0		
SL serratus area			7.5YR 3/ 3	7.5YR 5/ 3		N 2.5		
SL neck			10 YR 5/ 2	7.5YR 4/ 4		7.5YR 3/ 3		
SL neck			10 YR 6/ 2	7.5YR 3/ 3		10 YR 2/ 2		
RIGHT SCAPULA Lateral View								
SR spine			2.5Y 4/ 2	7.5YR 5/ 1				
SR spine			10 YR 3/ 2	7.5YR 6/ 1				
SR tuber spinae			7.5YR 7/ 2	7.5YR 7/ 2				
SR acromion			10 YR 4/ 2	2.5Y 5/ 2				
SR supraspinous fossa			10 YR 3/ 2	10 YR 2/ 2				
SR supraspinous fossa			10 YR 2/ 2	2.5Y 2/ 2				
SR supraspinous fossa			7.5YR 3/ 2	10 YR 2/ 1				
SR infraspinous fossa			7.5Y 4/ 1	2.5Y 2/ 2		7.5YR 2/ 3		
SR infraspinous fossa			10 YR 3/ 2	10 YR 2/ 2		N 2.0		
SR infraspinous fossa			7.5YR 2/ 2	10 YR 2/ 2		N 1.5		
SR infraspinous fossa			2.5Y 2/ 1	10 YR 3/ 2		2.5Y 2/ 1		
SR neck			7.5YR 4/ 3	10 YR 4/ 3		10 YR 3/ 3		
SR neck			10 YR 3/ 2	10 YR 4/ 2		N 1.0		
SR tuber scapulae			N/A	7.5YR 4/ 3		N 1.5		
SR glenoid cavity			N/A	7.5YR 2/ 3		N 2.0		
SR glenoid cavity			7.5YR 2/ 3	10 YR 3/ 3				
SR anterior border			10 YR 5/ 3	10 YR 5/ 3				
SR anterior border			10 YR 4/ 2	10 YR 6/ 3				
SR anterior border			10 YR 4/ 2	10 YR 6/ 2		N/A		

RIGHT SCAPULA Lateral View (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
SR anterior angle			10 YR 4/ 2	10 YR 6/ 3		N/A		
SR posterior border			7.5YR 4/ 2	10 YR 4/ 3		5 Y 2/ 1		
SR posterior border			10 YR 6/ 2	10 YR 6/ 3		N 2.0		
SR posterior border			7.5YR 5/ 2	10 YR 5/ 2		N 2.0		
SR posterior angle			10 YR 6/ 2	7.5YR 4/ 3		2.5Y 3/ 1		
RIGHT SCAPULA Medial View								
SR subscapular fossa			10 YR 4/ 2	7.5YR 4/ 3		10 YR 6/ 2		
SR subscapular fossa			10 YR 5/ 2	7.5YR 5/ 2		7.5YR 6/ 2		
SR subscapular fossa			10 YR 7/ 2	10 YR 5/ 3		7.5YR 7/ 2		
SR subscapular fossa			7.5YR 4/ 2	10 YR 4/ 2		N 2.0		
SR subscapular fossa			7.5YR 6/ 3	7.5YR 4/ 3		7.5YR 7/ 2		
SR serratus area			10 YR 5/ 2	7.5YR 5/ 3		N 2.5		
SR serratus area			10 YR 5/ 2	7.5YR 5/ 2		N 1.5		
SR serratus area			10 YR 3/ 2	7.5YR 5/ 4		5 YR 7/ 2		
SR neck			10 YR 5/ 3	7.5YR 5/ 3		2.5GY 2/ 1		
SR neck			7.5YR 4/ 3	10 YR 4/ 2		7.5YR 4/ 3		
LEFT HUMERUS								
HL head epiphysis			10 R 7/ 1	7.5YR 4/ 2		10 YR 2/ 1		
HL head epiphysis			7.5YR 7/ 2	7.5YR 6/ 2		10 YR 4/ 3		
HL lateral epiphysis			2.5Y 7/ 2	10 YR 7/ 4		10 YR 3/ 1		
HL lateral epiphysis			10 YR 6/ 2	10 YR 7/ 2		10 YR 5/ 2		
HL deltoid tuberosity			7.5YR 5/ 3	10 YR 6/ 4				
HL cranial aspect of metaphysis			10 YR 5/ 3	7.5YR 7/ 3		10 YR 5/ 3		
HL cranial aspect of metaphysis			10 YR 5/ 2	7.5YR 7/ 3				
HL cranial aspect of metaphysis			10 YR 6/ 2	10 YR 8/ 3				

LEFT HUMERUS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
HL cranial aspect of metaphysis			10 YR 4/ 2	7.5YR 5/ 2				
HL lateral aspect of neck			10 YR 3/ 2	10 YR 3/ 3				
HL lateral aspect of neck			10 YR 3/ 3	10 YR 3/ 3				
HL lateral aspect of metaphysis			10 YR 6/ 2	10 YR 6/ 3				
HL lateral aspect of metaphysis			7.5YR 7/ 2	10 YR 7/ 2				
HL lateral aspect of metaphysis			10 YR 7/ 2	2.5Y 7/ 2				
HL lateral aspect of metaphysis			7.5YR 5/ 3	10 YR 6/ 3				
HL caudal aspect of neck			10 YR 2/ 2	7.5YR 2/ 3				
HL caudal aspect of neck			10 YR 3/ 3	7.5YR 2/ 3				
HL caudal aspect of metaphysis			2.5Y 3/ 1	10 YR 3/ 3				
HL caudal aspect of metaphysis			10 YR 4/ 2	2.5Y 4/ 3				
HL caudal aspect of metaphysis			2.5Y 5/ 2	10 YR 6/ 3				
HL caudal aspect of metaphysis			7.5YR 5/ 2	7.5YR 6/ 2				
HL medial aspect of neck			10 YR 3/ 3	7.5YR 3/ 3				
HL medial aspect of neck			10 YR 4/ 3	7.5YR 5/ 3				
HL medial aspect of metaphysis			10 YR 4/ 2	5 YR 6/ 2				
HL medial aspect of metaphysis			7.5YR 3/ 2	7.5YR 6/ 3				
HL medial aspect of metaphysis			10 YR 4/ 2	10 YR 5/ 3				
HL medial aspect of metaphysis			2.5Y 5/ 2	7.5YR 5/ 3				
HL coronoid fossa			5 Y 3/ 2	2.5Y 3/ 2				
HL medial epicondyle			10 YR 4/ 3	7.5YR 4/ 4				
HL medial condyle			10 YR 4/ 2	10 YR 5/ 3				
HL lateral condyle			7.5YR 4/ 3	10 YR 5/ 3		7.5YR 3/ 3		
HL lateral epicondyle			2.5Y 6/ 2	2.5Y 7/ 2				

LEFT HUMERUS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
HL lateral condyloid crest			10 YR 5/ 2	7.5YR 6/ 4		10 YR 5/ 2		
HL olecranon fossa			7.5YR 2/ 1	2.5Y 2/ 2		10 YR 2/ 2		
RIGHT HUMERUS								
HR head epiphysis			7.5YR 4/ 3	7.5YR 5/ 2		7.5YR 5/ 3		
HR head epiphysis			7.5YR 6/ 2	10 YR 4/ 3		5 Y 3/ 1		
HR lateral epiphysis			7.5Y 2/ 2	N/A		10 YR 2/ 1		
HR lateral epiphysis			2.5Y 3/ 1	N/A		7.5YR 3/ 2		
HR deltoid tuberosity			2.5Y 2/ 2	10 YR 6/ 3				
HR cranial aspect of metaphysis			7.5YR 5/ 3	2.5Y 6/ 1				
HR cranial aspect of metaphysis			7.5YR 7/ 3	7.5YR 6/ 2				
HR cranial aspect of metaphysis			7.5YR 6/ 2	7.5YR 8/ 2				
HR cranial aspect of metaphysis			10 YR 4/ 2	5 YR 5/ 2				
HR lateral aspect of neck			7.5YR 3/ 3	7.5YR 4/ 3				
HR lateral aspect of neck			10 YR 2/ 2	7.5YR 5/ 3				
HR lateral aspect of metaphysis			10 YR 3/ 1	10 YR 6/ 2				
HR lateral aspect of metaphysis			7.5YR 5/ 1	7.5YR 5/ 2				
HR lateral aspect of metaphysis			5 YR 4/ 1	2.5Y 6/ 2				
HR lateral aspect of metaphysis			5 YR 3/ 2	10 YR 5/ 2				
HR caudal aspect of neck			7.5YR 4/ 3	7.5YR 4/ 3				
HR caudal aspect of neck			7.5YR 2/ 3	10 YR 3/ 3				
HR caudal aspect of metaphysis			2.5Y 4/ 1	5 Y 3/ 1				
HR caudal aspect of metaphysis			10 YR 5/ 2	2.5Y 7/ 2				
HR caudal aspect of metaphysis			10 YR 6/ 2	2.5Y 8/ 2				
HR caudal aspect of metaphysis			10 YR 5/ 2	7.5YR 7/ 2		7.5YR 3/ 2		
HR medial aspect of neck			7.5YR 6/ 3	10 YR 5/ 2				

RIGHT HUMERUS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
HR medial aspect of neck			10 YR 4/ 2	10 YR 4/ 2				
HR medial aspect of metaphysis			7.5YR 8/ 2	2.5Y 5/ 2				
HR medial aspect of metaphysis			7.5YR 7/ 2	7.5YR 5/ 2				
HR medial aspect of metaphysis			7.5YR 7/ 2	10 YR 6/ 2				
HR medial aspect of metaphysis			7.5YR 6/ 2	5 YR 4/ 2				
HR coronoid fossa			5 Y 3/ 1	2.5Y 2/ 2				
HR medial epicondyle			10 YR 4/ 3	10 YR 5/ 2		N/A		
HR medial condyle			7.5YR 3/ 2	10 YR 5/ 4				
HR lateral condyle			10 YR 3/ 3	10 YR 5/ 2				
HR lateral epicondyle			5 YR 3/ 3	7.5YR 4/ 3		10 YR 3/ 3		
HR lateral condyloid crest			10 YR 3/ 2	7.5YR 6/ 3		7.5YR 3/ 3		
HR olecranon fossa			5 Y 2/ 1	7.5YR 2/ 3				
LEFT RADIUS								
RL proximal epiphysis			10 YR 4/ 3	10 YR 4/ 2				N/A
RL proximal epiphysis			10 YR 4/ 3	7.5YR 5/ 2				N/A
RL cranial aspect of metaphysis			10 YR 7/ 2	10 YR 4/ 2				
RL cranial aspect of metaphysis			7.5YR 5/ 3	5 YR 3/ 2				
RL cranial aspect of metaphysis			10 YR 5/ 3	7.5YR 5/ 3				
RL cranial aspect of metaphysis			10 YR 5/ 3	7.5YR 5/ 2				
RL lateral aspect of metaphysis			7.5YR 5/ 2	10 YR 6/ 2				
RL lateral aspect of metaphysis			10 YR 3/ 3	7.5YR 6/ 2				
RL lateral aspect of metaphysis			7.5YR 4/ 3	7.5YR 5/ 3				
RL lateral aspect of metaphysis			10 YR 6/ 3	7.5YR 5/ 3				
RL caudal aspect of metaphysis			7.5YR 3/ 3	10 YR 7/ 2				
RL caudal aspect of metaphysis			10 YR 3/ 2	10 YR 7/ 2				

LEFT RADIUS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
RL caudal aspect of metaphysis			7.5YR 2/ 3	2.5Y 7/ 1				
RL caudal aspect of metaphysis			10 YR 4/ 3	2.5Y 5/ 3				
RL medial aspect of metaphysis			7.5YR 3/ 2	10 YR 6/ 2				
RL medial aspect of metaphysis			10 YR 4/ 2	7.5YR 6/ 3				
RL medial aspect of metaphysis			10 YR 4/ 2	10 YR 6/ 3				
RL medial aspect of metaphysis			10 YR 4/ 2	10 YR 5/ 3				
RL distal epiphysis	N/A		10 YR 3/ 4	5 YR 3/ 1				
RL distal epiphysis	N/A		7.5YR 3/ 4	10 YR 6/ 2				
RIGHT RADIUS								
RR proximal epiphysis			10 YR 5/ 3	7.5YR 4/ 4				
RR proximal epiphysis			7.5YR 3/ 2	10 YR 5/ 3				
RR cranial aspect of metaphysis			7.5YR 7/ 2	10 YR 6/ 3				
RR cranial aspect of metaphysis			7.5YR 7/ 2	10 YR 7/ 2				
RR cranial aspect of metaphysis			10 YR 7/ 2	10 YR 7/ 2				
RR cranial aspect of metaphysis			7.5YR 6/ 2	7.5YR 7/ 3				
RR lateral aspect of metaphysis			7.5YR 3/ 1	2.5Y 6/ 1				
RR lateral aspect of metaphysis			2.5Y 4/ 1	7.5YR 5/ 2				
RR lateral aspect of metaphysis			10 YR 4/ 2	10 YR 5/ 1				
RR lateral aspect of metaphysis			10 YR 4/ 2	10 YR 4/ 2				
RR caudal aspect of metaphysis			7.5YR 5/ 3	10 YR 7/ 2				
RR caudal aspect of metaphysis			7.5YR 4/ 3	5 Y 7/ 1				
RR caudal aspect of metaphysis			7.5YR 4/ 3	2.5Y 6/ 1				
RR caudal aspect of metaphysis			2.5Y 3/ 2	2.5Y 5/ 4				
RR medial aspect of metaphysis			7.5YR 4/ 1	2.5Y 7/ 1				
RR medial aspect of metaphysis			10 YR 4/ 2	10 YR 7/ 2				

RIGHT RADIUS	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
RR medial aspect of metaphysis			10 YR 3/ 2	7.5Y 8/ 1				
RR medial aspect of metaphysis			7.5YR 3/ 2	5 Y 8/ 1				
RR distal epiphysis			10 YR 3/ 3	7.5YR 4/ 2		7.5YR 7/ 3		
RR distal epiphysis			10 YR 5/ 3	10 YR 4/ 2		7.5YR 5/ 2		
LEFT ULNA								
UL olecranon epiphysis	N/A		7.5YR 7/ 3	10 YR 6/ 2				
UL olecranon epiphysis	N/A		10 YR 5/ 2	2.5Y 6/ 1				
UL cranial aspect of metaphysis			10 YR 4/ 2	7.5YR 3/ 2				
UL cranial aspect of metaphysis			7.5YR 2/ 3	10 YR 3/ 3				
UL cranial aspect of metaphysis			10 YR 5/ 3	10 YR 5/ 2				
UL cranial aspect of metaphysis			10 YR 5/ 3	2.5Y 5/ 2				
UL lateral aspect of metaphysis			7.5Y 4/ 1	10 YR 4/ 2				
UL lateral aspect of metaphysis			10 YR 6/ 2	2.5Y 7/ 1				
UL lateral aspect of metaphysis			10 YR 7/ 2	10 YR 6/ 2				
UL lateral aspect of metaphysis			10 YR 6/ 2	10 YR 5/ 4				
UL caudal aspect of metaphysis			10 YR 3/ 2	10 YR 5/ 3				
UL caudal aspect of metaphysis			2.5Y 3/ 1	7.5YR 5/ 2				
UL caudal aspect of metaphysis			10 YR 3/ 2	7.5YR 5/ 2				
UL caudal aspect of metaphysis			10 YR 3/ 2	7.5YR 5/ 3				
UL medial aspect ofmetaphysis			7.5YR 4/ 2	10 YR 4/ 3				
UL medial aspect ofmetaphysis			10 YR 3/ 2	10 YR 5/ 2				
UL medial aspect ofmetaphysis			10 YR 2/ 1	10 YR 4/ 2				
UL medial aspect ofmetaphysis			7.5YR 4/ 2	10 YR 5/ 3				
RIGHT ULNA								
UR olecranon epiphysis			10 YR 6/ 3	7.5YR 5/ 4				

RIGHT ULNA (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
UR olecranon epiphysis			10 YR 4/ 2	10 YR 8/ 3		N/A		
UR cranial aspect of metaphysis			7.5YR 2/ 3	10 YR 5/ 2		10 YR 5/ 3		
UR cranial aspect of metaphysis			10 YR 2/ 2	10 YR 5/ 2		7.5YR 2/ 3		
UR cranial aspect of metaphysis			10 YR 4/ 3	2.5Y 7/ 1				
UR cranial aspect of metaphysis			10 YR 3/ 2	7.5YR 5/ 3				
UR lateral aspect of metaphysis			10 YR 3/ 3	10 YR 5/ 2		5 YR 2/ 3		
UR lateral aspect of metaphysis			7.5YR 3/ 3	10 YR 6/ 3		7.5YR 3/ 3		
UR lateral aspect of metaphysis			7.5YR 5/ 2	7.5YR 6/ 2				
UR lateral aspect of metaphysis			10 YR 4/ 2	7.5YR 5/ 2				
UR caudal aspect of metaphysis			10 YR 6/ 3	10 YR 7/ 3		7.5YR 5/ 4		
UR caudal aspect of metaphysis			10 YR 6/ 3	10 YR 6/ 2				
UR caudal aspect of metaphysis			10 YR 3/ 2	2.5Y 6/ 1		10 YR 2/ 2		
UR caudal aspect of metaphysis			10 YR 3/ 2	10 YR 7/ 3				
UR medial aspect of metaphysis			10 YR 6/ 2	2.5Y 6/ 3				
UR medial aspect of metaphysis			7.5YR 8/ 2	10 YR 8/ 2		2.5Y 4/ 3		
UR medial aspect of metaphysis			10 YR 5/ 3	10 YR 7/ 3				
UR medial aspect of metaphysis			2.5Y 6/ 3	10 YR 7/ 4				
LEFT 3RD METACARPAL								
MC L3 dorsal aspect			2.5Y 3/ 1	5 YR 2/ 2				
MC L3 dorsal aspect			7.5YR 3/ 1	7.5YR 4/ 2				
MC L3 volar aspect			10 YR 6/ 3	7.5YR 3/ 2				
MC L3 volar aspect			10 YR 5/ 3	7.5YR 3/ 2				
LEFT 4TH METACARPAL								
MC L4 dorsal aspect			10 YR 6/ 3	10 YR 6/ 4				
MC L4 dorsal aspect			10 YR 5/ 3	10 YR 6/ 3				

LEFT 4TH METACARPAL	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
MC L4 volar aspect			10 YR 6/ 4	7.5YR 4/ 4				
MC L4 volar aspect			10 YR 6/ 3	10 YR 4/ 2				
RIGHT 3RD METACARPAL								
MC R3 dorsal aspect			10 YR 8/ 4	10 YR 3/ 2				
MC R3 dorsal aspect			10 YR 6/ 3	10 YR 3/ 2				
MC R3 volar aspect			10 YR 6/ 4	10 YR 7/ 3				
MC R3 volar aspect			10 YR 3/ 2	10 Y 7/ 1				
RIGHT 4TH METACARPAL								
MC R4 dorsal aspect			7.5YR 3/ 1	10 YR 5/ 2				
MC R4 dorsal aspect			7.5YR 3/ 2	7.5YR 8/ 2				
MC R4 volar aspect			7.5YR 5/ 4	10 YR 6/ 3				
MC R4 volar aspect			7.5YR 4/ 2	10 YR 5/ 2				
LEFT 1ST & 2ND METACARPALS								
MC L1 dorsal aspect			5 YR 2/ 2	7.5YR 8/ 2				
MC L1 dorsal aspect			10 YR 4/ 1	7.5YR 7/ 3				
MC L1 volar aspect			10 YR 6/ 3	7.5YR 4/ 4				
MC L1 volar aspect			2.5Y 3/ 4	7.5YR 5/ 3				
MC L2 dorsal aspect			10 YR 2/ 1	2.5Y 5/ 2				
MC L2 dorsal aspect			2.5Y 2/ 2	10 YR 7/ 2				
MC L2 volar aspect			7.5YR 2/ 2	10 YR 4/ 3				
MC L2 volar aspect			10 YR 3/ 2	7.5YR 2/ 2				
RIGHT 1ST & 2ND METACARPALS								
MC R1 dorsal aspect			2.5Y 3/ 2	10 YR 5/ 2				
MC R1 dorsal aspect			2.5Y 6/ 2	10 YR 6/ 2				
MC R1 volar aspect			7.5YR 4/ 3	10 YR 7/ 2				

RIGHT 1ST & 2ND METACARPALS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
MC R1 volar aspect			10 YR 4/ 2	10 YR 3/ 3				
MC R2 dorsal aspect			7.5YR 5/ 3	7.5YR 5/ 2			N/A	N/A
MC R2 dorsal aspect			10 YR 6/ 3	7.5YR 4/ 3			N/A	N/A
MC R2 volar aspect			10 YR 5/ 3	2.5Y 3/ 1			N/A	N/A
MC R2 volar aspect			10 YR 7/ 3	2.5Y 3/ 1			N/A	N/A
LEFT FEMUR								
FL head epiphysis			10 YR 4/ 2	10 YR 5/ 3	2.5PB 2/ 1			
FL head epiphysis			2.5Y 4/ 1	10 YR 4/ 2	10 YR 4/ 1			
FL trochanter epiphysis			7.5YR 5/ 3	7.5YR 7/ 2	N 2.0			
FL trochanter epiphysis			10 YR 5/ 2	10 YR 8/ 2	10 YR 2/ 1			
FL neck			10 YR 2/ 2	2.5Y 4/ 2	N 1.5	10 YR 3/ 3		
FL neck			7.5YR 2/ 2	7.5YR 5/ 3	N 2.0	7.5YR 3/ 2		
FL anterior aspect of metaphysis			10 YR 5/ 2	10 YR 6/ 3	7.5Y 2/ 1			
FL anterior aspect of metaphysis			10 YR 6/ 3	10 YR 6/ 3	10 YR 2/ 1			
FL anterior aspect of metaphysis			2.5Y 6/ 3	10 YR 7/ 3				
FL anterior aspect of metaphysis			10 YR 5/ 3	10 YR 6/ 3		10 YR 4/ 3		
FL anterior aspect of metaphysis			7.5YR 3/ 3	10 YR 5/ 2	10 YR 4/ 3	7.5YR 5/ 3		
FL lateral aspect of metaphysis			10 YR 6/ 3	10 YR 6/ 3				
FL lateral aspect of metaphysis			7.5YR 4/ 3	10 YR 7/ 2				
FL lateral aspect of metaphysis			10 YR 6/ 3	10 YR 7/ 3				
FL lateral aspect of metaphysis			10 YR 5/ 3	7.5YR 4/ 4				
FL lateral aspect of metaphysis			7.5YR 2/ 3	10 YR 4/ 4				
FL caudal aspect of metaphysis			7.5YR 3/ 1	10 YR 5/ 2	10 YR 2/ 1	10 YR 4/ 2		
FL caudal aspect of metaphysis			10 YR 5/ 2	10 YR 6/ 2	10 YR 2/ 1	7.5YR 5/ 4		
FL caudal aspect of metaphysis			10 YR 5/ 2	7.5YR 7/ 2	10 YR 2/ 1	7.5YR 3/ 3		

LEFT FEMUR (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
FL caudal aspect of metaphysis			10 YR 3/ 2	10 YR 6/ 2	10 YR 2/ 1	7.5YR 5/ 4		
FL caudal aspect of metaphysis			10 YR 3/ 2	10 YR 3/ 3	7.5YR 2/ 1	10 YR 4/ 3		
FL medial aspect of metaphysis			10 YR 5/ 2	10 YR 4/ 2	N 1.5	10 YR 3/ 2		
FL medial aspect of metaphysis			10 YR 4/ 3	10 YR 5/ 2	N 2.5	7.5YR 4/ 3		
FL medial aspect of metaphysis			10 YR 4/ 3	7.5YR 5/ 3	10 YR 2/ 1	7.5YR 3/ 2		
FL medial aspect of metaphysis			10 YR 5/ 2	7.5YR 6/ 2	N/A	7.5YR 3/ 2		
FL medial aspect of metaphysis			2.5Y 6/ 2	10 YR 5/ 2	7.5YR 2/ 2	5 YR 2/ 2		
FL medial epicondyle			10 YR 5/ 2	7.5YR 5/ 2	10 YR 6/ 3	7.5YR 2/ 1		
FL medial epicondyle			7.5YR 3/ 3	10 YR 6/ 2	10 YR 6/ 2	7.5YR 2/ 2		
FL medial condyle			7.5YR 3/ 2	10 YR 7/ 2	10 YR 4/ 3	7.5YR 3/ 3		
FL medial condyle			7.5YR 3/ 2	10 YR 4/ 3	2.5Y 3/ 1	7.5YR 3/ 2		
FL lateral epicondyle			7.5YR 4/ 3	10 YR 4/ 3				
FL lateral epicondyle			10 YR 6/ 3	7.5YR 7/ 3				
FL lateral condyle			10 YR 4/ 2	10 YR 6/ 3	N 1.5			
FL lateral condyle			7.5YR 4/ 3	7.5YR 5/ 3	2.5Y 2/ 1			
FL trochlea			10 YR 3/ 2	10 YR 6/ 2	N 1.5	10 YR 2/ 1		
FL trochlea			7.5YR 3/ 3	10 YR 5/ 2		10 YR 2/ 1		
FL Intercondyloid fossa			5 Y 2/ 2	10 YR 2/ 2		7.5YR 2/ 3		
RIGHT FEMUR								
FR head epiphysis			10 YR 4/ 3	10 YR 8/ 3	N 2.0	2.5Y 2/ 1		
FR head epiphysis			7.5YR 4/ 3	10 YR 5/ 3	N 2.5	7.5YR 3/ 3		
FR trochanter epiphysis	N/A		2.5Y 4/ 2	10 YR 6/ 2	N/A	N/A	N/A	
FR trochanter epiphysis	N/A		10 YR 5/ 2	10 YR 6/ 2	N/A	N/A	N/A	
FR neck			10 YR 3/ 2	7.5YR 5/ 4	7.5YR 3/ 2	7.5YR 4/ 3		
FR neck			7.5YR 3/ 3	10 YR 3/ 3	5 YR 3/ 4	10 YR 4/ 2		

RIGHT FEMUR (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
FR anterior aspect of metaphysis			10 YR 6/ 2	10 YR 4/ 3				
FR anterior aspect of metaphysis			2.5Y 6/ 1	10 YR 7/ 3				
FR anterior aspect of metaphysis			10 YR 6/ 2	10 YR 7/ 2				
FR anterior aspect of metaphysis			7.5YR 5/ 3	10 YR 7/ 3				
FR anterior aspect of metaphysis			7.5YR 5/ 3	7.5YR 5/ 3				
FR lateral aspect of metaphysis			7.5YR 5/ 2	7.5YR 6/ 3				
FR lateral aspect of metaphysis			10 YR 6/ 1	7.5YR 7/ 1				
FR lateral aspect of metaphysis			7.5YR 6/ 2	7.5YR 7/ 1				
FR lateral aspect of metaphysis			7.5YR 5/ 2	10 YR 6/ 2				
FR lateral aspect of metaphysis			7.5YR 4/ 3	7.5YR 6/ 2				
FR caudal aspect of metaphysis			10 YR 4/ 2	10 YR 7/ 2		N/A		
FR caudal aspect of metaphysis			10 YR 5/ 2	7.5YR 6/ 3		10 YR 2/ 1		
FR caudal aspect of metaphysis			10 YR 5/ 2	10 YR 6/ 2		10 YR 2/ 1		
FR caudal aspect of metaphysis			2.5Y 5/ 1	10 YR 7/ 2		N/A		
FR caudal aspect of metaphysis			10 YR 3/ 2	10 YR 5/ 2		N/A		
FR medial aspect of metaphysis			2.5Y 3/ 1	10 YR 6/ 3				
FR medial aspect of metaphysis			10 YR 4/ 2	10 YR 7/ 2				
FR medial aspect of metaphysis			10 YR 3/ 2	10 YR 6/ 3				
FR medial aspect of metaphysis			7.5YR 5/ 2	2.5Y 8/ 3		10 YR 3/ 3		
FR medial aspect of metaphysis			10 YR 4/ 2	10 YR 7/ 6		7.5YR 2/ 2		
FR medial epicondyle			5 YR 4/ 3	10 YR 7/ 2		7.5YR 2/ 1		
FR medial epicondyle			7.5YR 7/ 3	7.5YR 8/ 2		7.5YR 2/ 1		
FR medial condyle			10 YR 6/ 3	10 YR 5/ 3		10 YR 2/ 1		
FR medial condyle			10 YR 5/ 2	10 YR 5/ 3		N/A		
FR lateral epicondyle			10 YR 3/ 2	7.5YR 3/ 3		10 YR 3/ 2		

RIGHT FEMUR (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
FR lateral epicondyle			7.5YR 4/ 3	10 YR 7/ 3		10 YR 5/ 2		
FR lateral condyle			7.5YR 4/ 2	10 YR 6/ 2		10 YR 2/ 1		
FR lateral condyle			7.5YR 5/ 2	7.5YR 5/ 4		10 YR 2/ 1		
FR trochlea			7.5YR 6/ 2	7.5YR 5/ 4		10 YR 2/ 1		
FR trochlea			7.5YR 6/ 2	10 YR 5/ 3		10 YR 2/ 1		
FR Intercondyloid fossa			7.5YR 4/ 2	10 YR 2/ 2				
Patellae								
PU anterior aspect			7.5YR 6/ 3	10 YR 8/ 3	N 2.5	N 2.0		
PU anterior aspect			10 YR 5/ 2	10 YR 8/ 2	N 2.0			
PU posterior aspect			5 YR 3/ 2	7.5YR 5/ 4	N 3.5			
PU posterior aspect			7.5YR 5/ 2	10 YR 5/ 4	N 1.5			
PU anterior aspect	N/A		10 YR 4/ 3	N/A	10 YR 2/ 1			N/A
PU anterior aspect	N/A		7.5YR 5/ 3	N/A				N/A
PU posterior aspect	N/A		2.5Y 6/ 2	N/A				N/A
PU posterior aspect	N/A		10 YR 4/ 3	N/A		7.5YR 2/ 1		N/A
LEFT TIBIA								
TL medial condyle prox epiphysis			7.5YR 5/ 2	10 YR 5/ 2	7.5YR 4/ 1			
TL medial condyle prox epiphysis			7.5YR 5/ 2	7.5YR 6/ 1	N 4.5			
TL spine of tibia prox epiphysis			7.5YR 3/ 2	7.5YR 5/ 2	N 3.5			
TL lateral condyle prox epiphysis			10 YR 3/ 3	5 YR 6/ 2	10 YR 3/ 1			
TL lateral condyle prox epiphysis			5 YR 4/ 3	7.5YR 5/ 3	N 2.5			
TL crest of tibia			2.5Y 3/ 2	10 YR 4/ 2	N/A			
TL crest of tibia			7.5YR 4/ 2	10 YR 4/ 2	N/A			
TL anterior aspect of metaphysis			10 YR 5/ 2	7.5YR 5/ 3	2.5Y 2/ 1			
TL anterior aspect of metaphysis			10 YR 4/ 2	7.5YR 5/ 2	2.5G 2/ 2			

LEFT TIBIA (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
TL anterior aspect of metaphysis			10 YR 3/ 1	7.5YR 5/ 3	7.5YR 4/ 3			
TL anterior aspect of metaphysis			7.5YR 4/ 4	7.5YR 5/ 3	7.5YR 3/ 3			
TL caudal aspect of metaphysis			2.5Y 4/ 3	10 YR 6/ 3	2.5Y 2/ 2			
TL caudal aspect of metaphysis			10 YR 7/ 2	7.5Y 8/ 1				
TL caudal aspect of metaphysis			10 YR 8/ 2	5 Y 8/ 1				
TL caudal aspect of metaphysis			10 YR 7/ 2	10 YR 7/ 2				
TL medial malleolus dist epiphysis			7.5YR 3/ 2	10 YR 2/ 2				
TL medial malleolus dist epiphysis			7.5YR 2/ 3	10 YR 5/ 4				
RIGHT TIBIA								
TR medial condyle prox epiphysis			10 YR 5/ 2	5 YR 5/ 3	10 YR 5/ 3	N/A		
TR medial condyle prox epiphysis			7.5YR 5/ 2	10 YR 5/ 2		N/A		
TR spine of tibia prox epiphysis			7.5YR 4/ 2	10 YR 4/ 3				
TR lateral condyle prox epiphysis			7.5YR 5/ 3	10 YR 5/ 4				
TR lateral condyle prox epiphysis			2.5Y 6/ 1	7.5YR 6/ 2				
TR crest of tibia			10 YR 4/ 2	7.5YR 4/ 3	N 1.5	N 2.0	7.5YR 3/ 2	
TR crest of tibia			10 YR 5/ 2	10 YR 5/ 2	10 YR 2/ 1	N 2.5	7.5YR 2/ 2	
TR anterior aspect of metaphysis			10 YR 6/ 1	10 YR 5/ 2				
TR anterior aspect of metaphysis			10 YR 5/ 2	10 YR 6/ 2				
TR anterior aspect of metaphysis			10 YR 5/ 2	10 YR 6/ 2				
TR anterior aspect of metaphysis			2.5Y 4/ 1	7.5YR 7/ 2				
TR caudal aspect of metaphysis			7.5YR 4/ 3	10 YR 4/ 3		10 YR 5/ 4		
TR caudal aspect of metaphysis			10 Y 8/ 1	2.5YR 7/ 2				
TR caudal aspect of metaphysis			7.5Y 9/ 1	7.5YR 7/ 2				N 3.5
TR caudal aspect of metaphysis			10 YR 5/ 4	7.5YR 7/ 2				N 4.0
TR medial malleolus dist epiphysis			7.5YR 4/ 3	10 YR 5/ 3				10 YR 2/ 1

RIGHT TIBIA	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
TR medial malleolus dist epiphysis			10 YR 4/ 1	10 YR 4/ 3				10 YR 2/ 2
LEFT FIBULA								
FiL medial aspect of fibula			7.5YR 6/ 2	10 YR 7/ 2	7.5YR 4/ 3	N/A		
FiL medial aspect of fibula			2.5Y 4/ 1	2.5Y 7/ 1	2.5Y 3/ 1	10 YR 2/ 1		
FiL medial aspect of fibula			10 YR 5/ 2	5 Y 5/ 1	N 3.0	10 YR 2/ 1		
FiL medial aspect of fibula			7.5YR 3/ 1	10 YR 7/ 3	N/A	10 YR 5/ 4		
FiL lateral aspect of fibula			7.5YR 5/ 2	7.5YR 5/ 3	2.5Y 7/ 1	N/A		
FiL lateral aspect of fibula			10 YR 7/ 3	5 YR 7/ 2	N 4.0	N/A		
FiL lateral aspect of fibula			7.5YR 8/ 2	10 YR 6/ 2	5 BG 2/ 1	N 1.0		
FiL lateral aspect of fibula			10 YR 5/ 2	5 YR 3/ 2				
RIGHT FIBULA								
FiR medial aspect of fibula			7.5YR 5/ 2	10 YR 6/ 3		N 2.5		
FiR medial aspect of fibula			2.5Y 6/ 1	10 YR 7/ 2		N/A		
FiR medial aspect of fibula			10 YR 6/ 2	10 YR 6/ 2		5 YR 2/ 2		N 3.0
FiR medial aspect of fibula			10 YR 5/ 2	7.5YR 4/ 3		10 YR 5/ 2		2.5Y 3/ 1
FiR lateral aspect of fibula			10 YR 5/ 2	7.5YR 7/ 2		7.5Y 2/ 1		
FiR lateral aspect of fibula			10 Y 8/ 1	2.5Y 7/ 1		2.5Y 4/ 2		
FiR lateral aspect of fibula			2.5Y 5/ 1	5 Y 7/ 1		7.5YR 5/ 3		10 YR 4/ 2
FiR lateral aspect of fibula			10 YR 5/ 2	7.5YR 6/ 4		N/A		10 YR 3/ 1
LEFT ASTRAGALUS								
AL dorsal aspect			10 YR 3/ 1	10 YR 3/ 2	10 YR 3/ 2			
AL dorsal aspect			5 YR 2/ 2	7.5YR 5/ 3				
AL dorsal aspect			5 YR 2/ 2	10 YR 5/ 2				
AL plantar aspect			7.5YR 5/ 4	10 YR 2/ 1				
AL plantar aspect			7.5YR 7/ 2	7.5YR 5/ 3				

LEFT ASTRAGALUS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
AL plantar aspect			7.5YR 4/ 3	10 YR 6/ 2				
RIGHT ASTRAGALUS								
AR dorsal aspect			10 YR 6/ 2	7.5YR 5/ 3			10 YR 4/ 2	
AR dorsal aspect			10 YR 5/ 2	5 YR 6/ 3			2.5Y 4/ 1	
AR dorsal aspect			10 YR 4/ 3	7.5YR 5/ 3			10 YR 3/ 4	
AR plantar aspect			10 YR 5/ 2	7.5YR 5/ 3				
AR plantar aspect			10 YR 7/ 2	10 YR 6/ 4				
AR plantar aspect			10 YR 6/ 2	10 YR 6/ 4				
LEFT CALCANEUS								
CL dorsal aspect			7.5YR 5/ 3	10 YR 5/ 2				10 YR 6/ 2
CL dorsal aspect			10 YR 4/ 3	10 YR 3/ 2				2.5Y 4/ 1
CL dorsal aspect epiphysis			10 YR 3/ 2	2.5Y 7/ 2				10 YR 6/ 2
CL plantar aspect			10 YR 4/ 2	7.5YR 5/ 3				10 YR 5/ 2
CL plantar aspect			10 YR 6/ 6	7.5YR 4/ 3				2.5Y 8/ 3
CL plantar aspect epiphysis			2.5Y 6/ 2	10 YR 6/ 2				10 YR 7/ 2
RIGHT CALCANEUS								
CR dorsal aspect			10 YR 5/ 2	7.5YR 6/ 3		N/A		
CR dorsal aspect			10 YR 3/ 2	10 YR 3/ 3				
CR dorsal aspect epiphysis			10 YR 4/ 2	7.5YR 5/ 3				
CR plantar aspect			7.5YR 7/ 4	7.5YR 3/ 2				
CR plantar aspect			10 YR 5/ 3	5 YR 2/ 2				
CR plantar aspect epiphysis			10 YR 5/ 2	7.5YR 2/ 3				
LEFT 3rd METATARSAL								
MT L3 dorsal aspect			10 YR 3/ 2	5 YR 3/ 2	2.5Y 3/ 1			
MT L3 dorsal aspect			7.5YR 5/ 3	7.5YR 3/ 1				

LEFT 3rd METATARSAL (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
MT L3 dorsal aspect epiphysis			10 YR 6/ 2	7.5YR 3/ 1				
MT L3 plantar aspect			2.5Y 4/ 2	2.5Y 5/ 4				2.5Y 3/ 1
MT L3 plantar aspect			7.5YR 6/ 6	7.5YR 5/ 2				
MT L3 plantar aspect epiphysis			7.5YR 4/ 3	7.5YR 5/ 3				
LEFT 4th METATARSAL								
MT L4 dorsal aspect			7.5YR 5/ 2	10 YR 6/ 3	10 YR 4/ 2			
MT L4 dorsal aspect			7.5YR 4/ 3	7.5YR 5/ 3				
MT L4 dorsal aspect epiphysis			7.5YR 6/ 3	7.5YR 4/ 2				
MT L4 plantar aspect			7.5YR 5/ 3	10 YR 6/ 3				
MT L4 plantar aspect			10 YR 7/ 4	5 Y 7/ 1				
MT L4 plantar aspect epiphysis			7.5YR 5/ 3	10 YR 4/ 2				
LEFT 2nd &5th METATARSAL								
MT L2 dorsal aspect			7.5YR 4/ 2	10 YR 6/ 3		10 YR 2/ 2		
MT L2 dorsal aspect			10 YR 5/ 1	10 YR 7/ 3		N 2.5		
MT L2 plantar aspect			10 YR 4/ 1	10 YR 4/ 3				
MT L2 plantar aspect			10 YR 5/ 2	10 YR 6/ 4				
MT L5 dorsal aspect			10 YR 6/ 3	5 YR 2/ 2				N/A
MT L5 dorsal aspect			10 YR 7/ 4	7.5YR 3/ 1				N/A
MT L5 plantar aspect			7.5YR 4/ 2	10 YR 5/ 3				N/A
MT L5 plantar aspect			7.5YR 4/ 3	7.5YR 3/ 2				N/A
RIght 3rd METATARSAL								
MT L3 dorsal aspect			7.5YR 5/ 1	7.5YR 4/ 3				N 3.5
MT L3 dorsal aspect			10 YR 6/ 3	10 YR 5/ 3				7.5YR 4/ 3
MT L3 dorsal aspect epiphysis			7.5YR 3/ 2	7.5YR 4/ 4		10 YR 2/ 1		10 YR 2/ 1
MT L3 plantar aspect			10 YR 6/ 4	10 YR 8/ 3				N 1.0

RIght 3rd METATARSAL (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
MT L3 plantar aspect			10 YR 6/ 6	10 YR 3/ 2				
MT L3 plantar aspect epiphysis			10 YR 5/ 3	7.5YR 6/ 3				
RIGHT 4th METATARSAL								
MT L4 dorsal aspect			10 YR 5/ 2	7.5YR 3/ 2				10 YR 4/ 1
MT L4 dorsal aspect			7.5YR 5/ 2	7.5YR 3/ 2				
MT L4 dorsal aspect epiphysis			7.5YR 3/ 2	5 YR 2/ 2		2.5Y 3/ 1		
MT L4 plantar aspect			10 YR 6/ 2	7.5YR 7/ 2				N 4.5
MT L4 plantar aspect			10 YR 6/ 4	10 YR 6/ 2				
MT L4 plantar aspect epiphysis			7.5YR 5/ 4	10 YR 6/ 2				
Right 2nd &5th METATARSAL								
MT L2 dorsal aspect			7.5YR 3/ 3	7.5YR 3/ 2		7.5YR 3/ 2		2.5Y 2/ 1
MT L2 dorsal aspect			2.5Y 4/ 1	7.5YR 3/ 2		7.5YR 4/ 4		5 Y 2/ 2
MT L2 plantar aspect			10 YR 5/ 2	7.5YR 3/ 3				2.5GY 2/ 1
MT L2 plantar aspect			7.5YR 6/ 3	7.5YR 4/ 3				N 2.0
MT L5 dorsal aspect			10 YR 5/ 2	7.5YR 6/ 3		10 YR 3/ 3		10 YR 4/ 1
MT L5 dorsal aspect			10 YR 6/ 2	7.5YR 5/ 4		5 YR 2/ 2		10 YR 4/ 2
MT L5 plantar aspect			10 YR 5/ 3	10 YR 4/ 3				5 Y 4/ 1
MT L5 plantar aspect			7.5YR 3/ 3	7.5YR 6/ 3				10 Y 3/ 3
LEFT INNOMINATE								
IL pubic symphysis			10 YR 5/ 2	10 YR 6/ 2	10 YR 2/ 1			
IL pubic symphysis			10 YR 4/ 2	10 YR 7/ 2	2.5Y 3/ 1			
IL ischium medial aspect			10 YR 5/ 1	10 YR 6/ 2	7.5YR 3/ 1			
IL ischium medial aspect			2.5Y 5/ 2	10 YR 5/ 2	10 YR 2/ 1			
IL ischium medial aspect			10 YR 4/ 2	10 YR 4/ 2	N 1.5			
IL ischium lateral aspect			7.5YR 5/ 3	10 YR 7/ 2	N 2.0			

LEFT INNOMINATE (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
IL ischium lateral aspect			2.5Y 7/ 1	2.5Y 6/ 1	2.5Y 2/ 1			
IL ischium lateral aspect			7.5YR 4/ 3	10 YR 5/ 2	N 1.5			
IL lessor sciatic notch			10 YR 3/ 2	2.5Y 4/ 1	7.5YR 2/ 1	10 YR 2/ 1		
IL lessor sciatic notch			2.5Y 3/ 2	2.5Y 4/ 1	2.5Y 2/ 1	10 YR 3/ 3		
IL ischiatic spine			7.5YR 5/ 3	2.5Y 3/ 1	10 YR 3/ 3	7.5YR 3/ 2		
IL ischiatic spine			7.5YR 5/ 3	10 YR 5/ 2	10 YR 2/ 1	10 YR 3/ 2		
IL auricular surface			10 YR 6/ 2	10 YR 5/ 2	10 YR 5/ 2	5 YR 2/ 1		
IL auricular surface			7.5YR 4/ 2	7.5YR 6/ 3	10 YR 4/ 2			
IL auricular surface			7.5YR 4/ 2	10 YR 6/ 2	10 YR 2/ 2			
IL tuber sacrale			10 YR 5/ 2	7.5YR 4/ 3	N/A	10 YR 5/ 3		
IL tuber coxae			10 YR 5/ 2	7.5YR 5/ 3	2.5Y 3/ 1	7.5YR 2/ 3	10 YR 4/ 3	
IL crest of ilium			5 YR 3/ 3	10 YR 5/ 4	N 2.0	N/A	7.5YR 3/ 1	
IL crest of ilium			5 YR 3/ 2	5 YR 4/ 3	10 YR 2/ 1	N/A	7.5YR 2/ 2	
IL crest of ilium			10 YR 5/ 2	10 YR 6/ 4	N 2.0	N/A	10 YR 3/ 1	
IL acetabulum			7.5YR 3/ 2	10 YR 3/ 3	7.5YR 2/ 1			
IL acetabulum			10 YR 3/ 3	2.5Y 5/ 2	N 2.5			
IL acetabulum			10 YR 3/ 1	7.5YR 3/ 3	N 2.0			
IL greater sciatic notch			10 YR 5/ 2	2.5Y 5/ 2	10 YR 2/ 1			
IL greater sciatic notch			2.5Y 4/ 1	2.5Y 5/ 3	2.5Y 2/ 1			
IL gluteal line			10 YR 6/ 2	10 YR 7/ 3	N/A			
ILgluteal line			10 YR 6/ 2	10 YR 6/ 2	N/A			
IL ilium lateral aspect			10 YR 4/ 2	2.5YR 5/ 1	10 YR 2/ 1			
IL ilium lateral aspect			7.5YR 5/ 3	10 YR 7/ 4	7.5YR 3/ 1			
IL ilium lateral aspect			7.5YR 5/ 3	7.5YR 7/ 3	7.5YR 2/ 1			
IL ilium medial aspect			2.5Y 5/ 2	10 YR 4/ 2	N 2.0			

LEFT INNOMINATE (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
IL ilium medial aspect			10 YR 5/ 2	10 YR 6/ 3	10 YR 3/ 2			
IL ilium medial aspect			N/A	10 YR 5/ 1	10 Y 2/ 1			
RIGHT INNOMINATE								
IR pubic symphysis			10 YR 6/ 2	10 YR 6/ 3	10 YR 2/ 1			
IR pubic symphysis			10 YR 6/ 3	10 YR 7/ 2	2.5Y 3/ 1			
IR ischium medial aspect			5 YR 6/ 3	10 YR 6/ 3	N 1.5			
IR ischium medial aspect			5 YR 4/ 1	10 YR 6/ 2	10 YR 5/ 3			
IR ischium medial aspect			7.5YR 5/ 1	2.5Y 6/ 1	2.5Y 2/ 1			
IR ischium lateral aspect			10 YR 5/ 2	10 YR 5/ 2				
IR ischium lateral aspect			10 YR 5/ 1	10 YR 4/ 2		10 YR 3/ 3		
IR ischium lateral aspect			7.5YR 4/ 2	10 YR 6/ 2		7.5YR 3/ 3		
IR lessor sciatic notch			5 Y 4/ 1	10 YR 5/ 2	10 YR 5/ 3	10 YR 3/ 2		
IR lessor sciatic notch			2.5Y 3/ 1	7.5YR 4/ 2	7.5YR 2/ 3	10 YR 4/ 2		
IR ischiatic spine			2.5Y 4/ 2	10 YR 3/ 2	N 1.5			
IR ischiatic spine			10 YR 3/ 2	10 YR 5/ 3	7.5Y 2/ 2			
IR auricular surface			10 YR 5/ 2	2.5Y 7/ 4		10 YR 3/ 3		
IR auricular surface			10 YR 4/ 2	10 YR 7/ 4		10 YR 4/ 3		
IR auricular surface			10 YR 7/ 3	10 YR 7/ 3	2.5Y 2/ 1	7.5YR 3/ 3		
IR tuber sacrale			2.5Y 6/ 3	10 YR 7/ 2	N 1.5	N/A		
IR tuber coxae			7.5YR 7/ 4	10 YR 5/ 2		10 YR 2/ 2		
IR crest of ilium			10 YR 5/ 2	7.5YR 6/ 3		7.5YR 3/ 2		
IR crest of ilium			10 YR 5/ 3	10 YR 6/ 2	5 Y 3/ 1	N 2.0		
IR crest of ilium			10 YR 6/ 4	10 YR 6/ 3	10 YR 3/ 1	N 1.5		
IR acetabulum			10 YR 2/ 2	10 YR 5/ 2				
IR acetabulum			7.5YR 2/ 3	10 YR 3/ 2	10 YR 2/ 1			

RIGHT INNOMINATE (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
IR acetabulum			N/A	7.5YR 3/ 3	N 2.0			
IR greater sciatic notch			7.5YR 2/ 2	10 YR 4/ 2	2.5Y 2/ 1			
IR greater sciatic notch			N/A	7.5YR 2/ 1	N 1.0			
IR gluteal line			7.5YR 5/ 2	7.5YR 6/ 2	10 YR 3/ 2			
IR gluteal line			5 YR 5/ 2	7.5YR 6/ 2	7.5YR 2/ 2			
IR ilium lateral aspect			7.5YR 5/ 2	5 YR 6/ 2				
IR ilium lateral aspect			7.5YR 4/ 2	7.5YR 6/ 1				
IR ilium lateral aspect			10 YR 4/ 2	7.5YR 6/ 1				
IR ilium medial aspect			10 YR 6/ 2	2.5Y 6/ 2	7.5YR 4/ 3			
IR ilium medial aspect			2.5Y 6/ 1	10 YR 7/ 2				
IR ilium medial aspect			N/A	7.5YR 5/ 2				
LUMBAR REGION								
L7 L dorsal aspect of transverse process		N/A	N/A	10 YR 6/ 2	N/A	N/A		N/A
L7 L ventral aspect of transverse process		N/A	N/A	2.5Y 6/ 1	N/A	N/A		N/A
L7 L mammillary process		N/A	N/A	10 YR 7/ 3	10 YR 3/ 1	N/A		N/A
L7 L lateral aspect of spinous process		N/A	N/A	10 YR 7/ 3	5 G 3/ 3	N/A		N/A
L7 R lateral aspect of spinous process		N/A	N/A	10 YR 5/ 3	N 2.5	N/A		N/A
L7 R mammilary process		N/A	N/A	10 YR 7/ 2	2.5Y 4/ 1	N/A		N/A
L7 R dorsal aspect of transverse process		N/A	N/A	5 YR 4/ 2	N/A	N/A		N/A
L7 R ventral aspect of transverse process		N/A	N/A	10 YR 8/ 1	N/A	N/A		N/A
L6 L dorsal aspect of transverse process			10 YR 8/ 2	5 YR 7/ 2	N/A	N/A		
L6 L ventral aspect of transverse process			7.5YR 5/ 2	7.5YR 6/ 1	N/A	N/A		
L6 L mammillary process			10 YR 7/ 2	2.5Y 6/ 3	7.5R 2/ 1	N/A		
L6 L lateral aspect of spinous process			10 YR 5/ 2	10 YR 5/ 4	N 2.0	N/A		
L6 R lateral aspect of spinous process			10 YR 4/ 2	10 YR 5/ 4	2.5Y 2/ 1	N/A		

LUMBAR REGION (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
L6 R mammilary process			7.5YR 5/ 3	7.5YR 7/ 3	10 YR 3/ 2	N/A		
L6 R dorsal aspect of transverse process			5 YR 5/ 1	2.5YR 6/ 2	N/A	10 YR 5/ 3		
L6 R ventral aspect of transverse process			2.5Y 6/ 1	N 8.5	N/A	7.5YR 3/ 2		
L5 L dorsal aspect of transverse process			10 YR 6/ 2	7.5YR 6/ 2	N/A	N/A		
L5 L ventral aspect of transverse process			7.5YR 4/ 2	2.5Y 3/ 2	N/A	N/A		
L5 L mammillary process			7.5YR 6/ 3	7.5YR 6/ 3	N/A	N/A		
L5 L lateral aspect of spinous process			10 YR 6/ 3	7.5YR 5/ 4	7.5YR 3/ 3	N/A		
L5 R lateral aspect of spinous process			10 YR 5/ 2	2.5Y 5/ 2	10 YR 3/ 2	N/A		
L5 R mammilary process			10 YR 4/ 2	7.5YR 6/ 3		N/A		
L5 R dorsal aspect of transverse process			5 YR 5/ 2	7.5YR 6/ 2		7.5YR 6/ 2		
L5 R ventral aspect of transverse process			2.5Y 4/ 1	7.5YR 5/ 3		7.5GY 2/ 1		
L4 L dorsal aspect of transverse process			7.5YR 7/ 2	5 YR 6/ 3	N/A	N/A		
L4 L ventral aspect of transverse process			7.5YR 5/ 2	5 YR 5/ 1	N/A	N/A		
L4 L mammillary process			10 YR 7/ 3	7.5YR 7/ 4	N/A	N/A		
L4 L lateral aspect of spinous process			7.5YR 6/ 2	7.5YR 4/ 3	5 YR 2/ 1	N/A		
L4 R lateral aspect of spinous process			10 YR 5/ 1	7.5YR 5/ 4		N/A		
L4 R mammilary process			10 YR 5/ 3	10 YR 8/ 3		2.5Y 2/ 1		
L4 R dorsal aspect of transverse process			5 Y 6/ 1	10 YR 7/ 3		10 YR 3/ 1		
L4 R ventral aspect of transverse process			7.5YR 5/ 1	10 YR 6/ 2		2.5Y 2/ 1		
L3 L dorsal aspect of transverse process			7.5YR 5/ 3	7.5YR 7/ 3	N/A	N/A		
L3 L ventral aspect of transverse process			7.5YR 4/ 3	7.5YR 6/ 3	N/A	N/A		
L3 L mammillary process			10 YR 6/ 2	7.5YR 6/ 3	N/A	N/A		
L3 L lateral aspect of spinous process			10 YR 6/ 2	5 YR 4/ 4	10 YR 4/ 3	N/A		
L3 R lateral aspect of spinous process			10 YR 5/ 2	7.5YR 4/ 3		N/A		
L3 R mammilary process			2.5Y 5/ 2	7.5YR 5/ 3		N/A		

LUMBAR REGION (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
L3 R dorsal aspect of transverse process			10 YR 6/ 2	10 YR 7/ 3		2.5P 3/ 1		
L3 R ventral aspect of transverse process			7.5YR 5/ 2	10 YR 5/ 2		7.5BG 3/ 4		
L2 L dorsal aspect of transverse process			N/A	7.5YR 5/ 6	N/A	10 YR 3/ 1		
L2 L ventral aspect of transverse process			N/A	7.5YR 3/ 3	N/A	N 3.0		
L2 L mammillary process			5 YR 4/ 3	7.5YR 5/ 4	7.5Y 5/ 2	N 4.0		
L2 L lateral aspect of spinous process			10 YR 7/ 3	10 YR 5/ 3	2.5Y 3/ 2	N 2.5		
L2 R lateral aspect of spinous process			2.5Y 6/ 1	10 YR 5/ 2		N 1.5		
L2 R mammilary process			10 YR 5/ 2	7.5YR 6/ 3		N/A		
L2 R dorsal aspect of transverse process			N/A	7.5YR 8/ 2		7.5YR 2/ 1		
L2 R ventral aspect of transverse process			N/A	7.5YR 5/ 3		5P 2/1		
L1 L dorsal aspect of transverse process	N/A		2.5Y 4/ 2	2.5Y 4/ 3	N/A	N/A		
L1 L ventral aspect of transverse process	N/A		10 YR 5/ 2	10 YR 6/ 4	N/A	N/A		
L1 L mammillary process			7.5YR 5/ 3	7.5YR 5/ 6	7.5YR 4/ 2	N/A		
L1 L lateral aspect of spinous process			10 YR 7/ 2	7.5YR 4/ 3	7.5YR 5/ 3	10 Y 3/ 1		
L1 R lateral aspect of spinous process			2.5Y 6/ 2	5 YR 4/ 3		2.5G 2/ 1		
L1 R mammilary process			7.5YR 4/ 2	10 YR 6/ 2		5 YR 3/ 1		
L1 R dorsal aspect of transverse process	N/A		N 2.5	7.5YR 5/ 2		N 2.0		
L1 R ventral aspect of transverse process	N/A		2.5BG 5/ 1	10 YR 4/ 2		N 3.0		
THORACIC REGION								
T15 L articular process/cavity for rib head			10 YR 5/ 2	5 YR 5/ 4	N/A	2.5Y 3/ 1		
T15 L lateral aspect of spinous process			7.5YR 5/ 3	7.5YR 5/ 6	N/A	N 2.5		
T15 R lateral aspect of spinous process			2.5Y 6/ 1	5 YR 4/ 4	N/A	N 2.0		
T15 R articular process/cavity for rib head			10 YR 6/ 2	10 YR 5/ 2	N/A	N 4.0		
T14 L articular process/cavity for rib head			2.5Y 6/ 2	10 YR 3/ 3		N 2.5		
T14 L lateral aspect of spinous process			10 YR 5/ 2	7.5YR 4/ 4		N 2.5		

THORACIC REGION (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
T14 R lateral aspect of spinous process			2.5Y 6/ 1	7.5YR 3/ 3		N 2.0		
T14 R articular process/cavity for rib head			10 YR 4/ 2	7.5YR 4/ 2		2.5Y 2/ 1		
T13 L articular process/cavity for rib head			10 YR 5/ 2	7.5YR 5/ 4		2.5Y 2/ 1		
T13 L lateral aspect of spinous process			7.5YR 4/ 3	7.5YR 4/ 4		10 YR 3/ 1		
T13 R lateral aspect of spinous process			10 YR 5/ 2	5 YR 4/ 4		N 3.0		
T13 R articular process/cavity for rib head			10 YR 5/ 3	10 YR 5/ 2		N 2.0		
T12 L articular process/cavity for rib head			7.5YR 4/ 3	7.5YR 5/ 4		N/A		
T12 L lateral aspect of spinous process			7.5YR 4/ 3	7.5YR 5/ 4		10 YR 3/ 1		
T12 R lateral aspect of spinous process			10 YR 5/ 2	10 YR 3/ 3		N 3.5		
T12 R articular process/cavity for rib head			10 YR 4/ 2	7.5YR 4/ 3		10 YR 2/ 1		
T11 L articular process/cavity for rib head			7.5YR 5/ 3	7.5YR 5/ 6		10 YR 3/ 1		
T11 L lateral aspect of spinous process			10 YR 5/ 2	7.5YR 5/ 4		7.5YR 4/ 1		
T11 R lateral aspect of spinous process			2.5Y 6/ 1	7.5YR 4/ 4		N 4.0		
T11 R articular process/cavity for rib head			7.5YR 3/ 2	7.5YR 3/ 2		N/A		
T10 L articular process/cavity for rib head			10 YR 4/ 2	10 YR 4/ 4		N 3.5		
T10 L lateral aspect of spinous process		--------------	7.5YR 4/ 1	7.5YR 6/ 3		N 3.0		
T10 R lateral aspect of spinous process			7.5YR 7/ 1	7.5YR 4/ 4		2.5Y 2/ 1		
T10 R articular process/cavity for rib head			10 YR 5/ 3	10 YR 4/ 3		N/A		
T9 L articular process/cavity for rib head			10 YR 4/ 2	10 YR 3/ 3		10 YR 3/ 1		
T9 L lateral aspect of spinous process			7.5YR 5/ 2	7.5YR 5/ 3		N 4.0		
T9 R lateral aspect of spinous process			7.5YR 6/ 2	7.5YR 5/ 3		10 YR 2/ 1		
T9 R articular process/cavity for rib head			10 YR 6/ 4	2.5Y 4/ 2		N/A		
T8 L articular process/cavity for rib head			2.5Y 5/ 2	10 YR 4/ 3		N 4.5		
T8 L lateral aspect of spinous process			7.5YR 5/ 2	7.5YR 5/ 3		N 3.5		
T8 L lateral aspect of spinous process			7.5YR 6/ 1	7.5YR 4/ 3		5 YR 3/ 1		

THORACIC REGION (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
T8 R lateral aspect of spinous process			10 YR 6/ 2	7.5YR 6/ 2		N 3.5		
T8 R lateral aspect of spinous process			5 YR 5/ 1	7.5YR 4/ 3		N 2.0		
T8 R articular process/cavity for rib head			10 YR 6/ 4	7.5YR 5/ 3		10 YR 2/ 1		
T7 L articular process/cavity for rib head			7.5YR 4/ 2	7.5YR 4/ 3		10 YR 3/ 1		
T7 L lateral aspect of spinous process			2.5Y 6/ 1	10 YR 5/ 2		N 4.5		
T7 L lateral aspect of spinous process			7.5YR 6/ 2	7.5YR 5/ 3		N 5.0		
T7 R lateral aspect of spinous process			7.5YR 6/ 2	7.5YR 6/ 2		2.5G 2/ 1		
T7 R lateral aspect of spinous process			2.5Y 6/ 1	7.5YR 4/ 3		N 2.5		
T7 R articular process/cavity for rib head			7.5YR 6/ 4	10 YR 5/ 2		10 YR 2/ 1		
T6 L articular process/cavity for rib head			10 YR 5/ 2	7.5YR 4/ 3		7.5Y 2/ 1		
T6 L lateral aspect of spinous process			5 YR 4/ 2	10 YR 4/ 2		7.5Y 2/ 1		
T6 L lateral aspect of spinous process			5 YR 6/ 2	7.5YR 6/ 4		7.5YR 2/ 1		
T6 R lateral aspect of spinous process			10 YR 6/ 1	10 YR 5/ 2		5 Y 2/ 1		
T6 R lateral aspect of spinous process			7.5YR 5/ 2	10 YR 4/ 3		N 2.0		
T6 R articular process/cavity for rib head			10 YR 5/ 3	10 YR 5/ 3		2.5Y 2/ 1		
T5 L articular process/cavity for rib head			10 YR 5/ 2	7.5YR 4/ 3		10 YR 3/ 1		
T5 L lateral aspect of spinous process			10 YR 4/ 2	10 YR 5/ 2		7.5YR 2/ 1		
T5 L lateral aspect of spinous process			7.5YR 6/ 1	7.5YR 5/ 4		10 Y 3/ 4		
T5 R lateral aspect of spinous process			5 Y 7/ 1	10 YR 4/ 3		N 2.0		
T5 R lateral aspect of spinous process			5 Y 6/ 1	10 YR 4/ 2		N 1.5		
T5 R articular process/cavity for rib head			10 YR 6/ 3	7.5YR 4/ 3		N 1.5		
T4 L articular process/cavity for rib head			10 YR 4/ 2	10 YR 5/ 3		N 3.0		
T4 L lateral aspect of spinous process			5 YR 5/ 3	7.5YR 4/ 3		7.5YR 2/ 1		
T4 L lateral aspect of spinous process			10 YR 5/ 1	10 YR 6/ 2		N 2.0		
T4 R lateral aspect of spinous process			10 YR 7/ 1	10 YR 3/ 3		N 1.5		

THORACIC REGION (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
T4 R lateral aspect of spinous process			10 YR 4/ 2	7.5YR 4/ 2		N 2.5		
T4 R articular process/cavity for rib head			7.5YR 4/ 3	7.5YR 5/ 3		2.5Y 2/ 1		
T3 L articular process/cavity for rib head			10 YR 6/ 2	7.5YR 5/ 3		10 YR 3/ 1		
T3 L lateral aspect of spinous process			10 YR 7/ 2	10 YR 6/ 2		N 2.0		
T3 L lateral aspect of spinous process			10 YR 5/ 2	7.5YR 7/ 2		N 2.0		
T3 R lateral aspect of spinous process			10 YR 5/ 2	7.5YR 5/ 3		10 YR 3/ 1		
T3 R lateral aspect of spinous process			5 YR 4/ 2	10 YR 4/ 2		N 2.0		
T3 R articular process/cavity for rib head			7.5YR 4/ 2	10 YR 4/ 2		N 2.5		
T2 L articular process/cavity for rib head			10 YR 6/ 2	7.5YR 5/ 6		2.5Y 2/ 1		
T2 L lateral aspect of spinous process			10 YR 6/ 2	7.5YR 5/ 3		5 YR 4/ 1		
T2 L lateral aspect of spinous process			10 YR 5/ 2	10 YR 6/ 4		N 3.0		
T2 R lateral aspect of spinous process			10 YR 5/ 2	7.5YR 6/ 4		N 4.5		
T2 R lateral aspect of spinous process			2.5Y 6/ 1	7.5YR 5/ 3		10 B 5/ 1		
T2 R articular process/cavity for rib head			2.5Y 5/ 3	10 YR 5/ 2		7.5YR 2/ 1		
T1 L articular process/cavity for rib head		N/A	N/A	N/A		2.5Y 2/ 1	N/A	
T1 L lateral aspect of spinous process		N/A	N/A	N/A		2.5Y 2/ 1	N/A	
T1 L lateral aspect of spinous process		N/A	N/A	N/A		N 2.5	N/A	
T1 R lateral aspect of spinous process		N/A	N/A	N/A		10 YR 3/ 1	N/A	
T1 R lateral aspect of spinous process		N/A	N/A	N/A		N 2.5	N/A	
T1 R articular process/cavity for rib head		N/A	N/A	N/A		N 1.0	N/A	
CERVICAL REGION								
C7 L lateral aspect of arch			10 YR 4/ 2	10 YR 4/ 2		N 4.0		
C7 L lateral aspect of spinous process			10 YR 5/ 1	10 YR 2/ 1		7.5YR 4/ 1		
C7 L transverse process			10 YR 4/ 2	7.5YR 4/ 3		2.5Y 2/ 1		
C7 R lateral aspect of spinous process			2.5Y 5/ 2	10 YR 6/ 2		N 3.5		

CERVICAL REGION (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
C7 R lateral aspect of arch			7.5YR 4/ 3	10 YR 4/ 2		N 3.5		
C7 R transverse process			10 YR 2/ 2	5 YR 4/ 3		N 2.5		
C6 L lateral aspect of arch			7.5Y 4/ 1	7.5YR 4/ 3		10 YR 3/ 1		
C6 L lateral aspect of spinous process			10 YR 5/ 2	7.5YR 3/ 2		N 4.5		
C6 L transverse process			10 YR 4/ 2	10 YR 3/ 2		N 3.5		
C6 R lateral aspect of spinous process			10 YR 5/ 3	2.5Y 4/ 2		N 5.5		
C6 R lateral aspect of arch			7.5YR 3/ 2	10 YR 4/ 1		N 3.0		
C6 R transverse process			10 YR 4/ 3	10 YR 4/ 2		N/A		
C5 L lateral aspect of arch			10 YR 4/ 2	10 YR 3/ 3		N 2.5		
C5 L lateral aspect of spinous process			5 YR 5/ 2	10 YR 3/ 2		10 YR 4/ 1		
C5 L transverse process			10 YR 4/ 2	7.5YR 3/ 3		7.5Y 2/ 1		
C5 R lateral aspect of spinous process			2.5GY 4/ 2	2.5Y 3/ 2		5 Y 4/ 1		
C5 R lateral aspect of arch			2.5Y 2/ 1	N 1.0		2.5Y 2/ 1		
C5 R transverse process			10 YR 6/ 2	7.5YR 5/ 3		10 YR 2/ 2		
C4 L lateral aspect of arch			10 YR 5/ 2	2.5Y 2/ 2		N 1.5		
C4 L lateral aspect of spinous process			10 YR 5/ 2	10 YR 4/ 2		N/A		
C4 L transverse process			5 Y 6/ 1	7.5YR 3/ 3		N 1.0		
C4 R lateral aspect of spinous process			2.5Y 4/ 1	2.5Y 5/ 2		N/A		
C4 R lateral aspect of arch			7.5YR 5/ 2	2.5Y 4/ 2		7.5YR 2/ 1		
C4 R transverse process			7.5YR 5/ 2	10 YR 6/ 3		10 YR 5/ 2		
C3 L lateral aspect of arch			2.5Y 3/ 2	10 YR 4/ 2				
C3 L lateral aspect of spinous process			10 YR 4/ 2	10 YR 4/ 2				
C3 L transverse process			10 YR 5/ 1	7.5YR 3/ 3				
C3 R lateral aspect of spinous process			10 YR 5/ 2	10 YR 4/ 2				
C3 R lateral aspect of arch			10 YR 4/ 2	7.5Y 4/ 1				

CERVICAL REGION (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
C3 R transverse process			10 YR 5/ 3	10 YR 5/ 3				
C2 L lateral aspect of arch			10 YR 4/ 2	10 YR 4/ 2				
C2 L lateral aspect of spinous process			10 YR 5/ 3	7.5YR 4/ 3				
C2 L transverse process			10 YR 4/ 1	7.5YR 3/ 3				
C2 R lateral aspect of spinous process			2.5Y 7/ 2	7.5YR 5/ 2				
C2 R lateral aspect of arch			10 YR 5/ 1	10 YR 4/ 2				
C2 R transverse process			10 YR 4/ 2	10 YR 4/ 2				
C1 L wing			7.5YR 5/ 3	7.5YR 3/ 2				
C1 dorsal tuberosity			10 YR 5/ 3	7.5YR 6/ 2				
C1 R wing		N/A	7.5YR 5/ 2	7.5YR 3/ 3				N/A
SACRUM								
right auricular surface			7.5YR 4/ 3	10 YR 6/ 2	10 YR 2/ 1			
left auricular surface			7.5YR 3/ 2	10 YR 5/ 2	2.5Y 3/ 1			
arches of sacral vertebrae			2.5Y 6/ 2	2.5Y 5/ 2	N 1.0	N 1.0		
arches of sacral vertebrae			7.5YR 5/ 2	7.5YR 4/ 2	2.5Y 3/ 1	7.5YR 2/ 1		
arches of sacral vertebrae			10 YR 6/ 2	10 YR 5/ 4	N 2.0	7.5Y 2/ 1		
arches of sacral vertebrae			2.5Y 6/ 1	10 YR 6/ 3	10 YR 3/ 1	2.5Y 4/ 1		
arches of sacral vertebrae			10 YR 7/ 2	7.5YR 5/ 3	N 1.5	7.5YR 5/ 3		
ventral aspect of sacral body			2.5Y 5/ 1	10 YR 5/ 3	7.5YR 3/ 1			
ventral aspect of sacral body			7.5YR 4/ 3	10 YR 5/ 3	2.5Y 4/ 1			
ventral aspect of sacral body			7.5YR 4/ 3	10 YR 3/ 3	2.5Y 4/ 1			
ventral aspect of sacral body			10 YR 4/ 2	7.5YR 3/ 3	2.5Y 4/ 1			
ventral aspect of sacral body			7.5YR 4/ 2	7.5YR 3/ 3	10 YR 3/ 1			
LEFT RIBS								
R1 L head			10 YR 6/ 2	10 YR 7/ 3				

LEFT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R1 L tubercule			10 YR 5/ 2	7.5YR 5/ 4		N/A		
R1 L lateral aspect of shaft			7.5YR 4/ 2	7.5YR 7/ 3		N 2.0		
R1 L lateral aspect of shaft			7.5YR 4/ 1	10 YR 7/ 2		2.5G 2/ 1		
R1 L lateral aspect of shaft			10 YR 5/ 1	7.5YR 5/ 6		10 YR 2/ 1		
R1 L medial aspect of shaft			7.5YR 4/ 3	7.5YR 4/ 4		N 2.0		
R1 L medial aspect of shaft			10 YR 5/ 1	7.5YR 4/ 3		N 1.5		
R1 L medial aspect of shaft			10 YR 5/ 3	10 YR 5/ 3		10 YR 3/ 1		
R1 L sternal end			10 YR 4/ 2	10 YR 7/ 3		7.5YR 5/ 1		
R2 L head			5 YR 6/ 3	7.5YR 5/ 4		5 YR 2/ 1		
R2 L tubercule			7.5YR 6/ 3	5 YR 5/ 2		N 2.0		
R2 L lateral aspect of shaft			10 YR 7/ 2	7.5YR 6/ 2		5 PB 4/ 1		
R2 L lateral aspect of shaft			7.5YR 7/ 2	10 YR 6/ 3		N/A		
R2 L lateral aspect of shaft			10 YR 4/ 2	10 YR 7/ 3		7.5YR 3/ 1		
R2 L medial aspect of shaft			10 YR 5/ 2	10 YR 4/ 2		N 2.0		
R2 L medial aspect of shaft			10 YR 6/ 2	7.5YR 5/ 3		N 3.0		
R2 L medial aspect of shaft			10 YR 6/ 3	10 YR 5/ 4		10 YR 2/ 1		
R2 L sternal end			10 YR 6/ 3	10 YR 5/ 4		10 YR 2/ 1		
R3 L head			2.5Y 5/ 2	7.5YR 5/ 4		2.5B 3/ 1		
R3 L tubercule			7.5YR 6/ 3	7.5YR 4/ 3		7.5GY 2/ 3		
R3 L lateral aspect of shaft			7.5YR 5/ 2	10 YR 4/ 2		N 2.5		
R3 L lateral aspect of shaft			7.5YR 5/ 1	10 YR 8/ 3		N 3.5		
R3 L lateral aspect of shaft			2.5Y 5/ 1	10 YR 5/ 3		N 3.0		
R3 L medial aspect of shaft			7.5YR 8/ 2	7.5YR 3/ 3		N 2.5		
R3 L medial aspect of shaft			10 YR 7/ 2	7.5YR 6/ 3		10 GY 3/ 1		
R3 L medial aspect of shaft			10 YR 5/ 3	10 YR 5/ 3		10 Y 3/ 1		

LEFT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R3 L sternal end			10 YR 5/ 4	10 YR 5/ 3		10 YR 2/ 1		
R4 L head			10 YR 6/ 3	7.5YR 4/ 3		N 2.0		
R4 L tubercule			2.5Y 5/ 3	7.5YR 5/ 4		10 R 2/ 2		
R4 L lateral aspect of shaft			5 YR 4/ 2	7.5YR 5/ 4		2.5PB 4/ 1		
R4 L lateral aspect of shaft			10 YR 4/ 2	7.5YR 6/ 4		N 2.5		
R4 L lateral aspect of shaft			7.5YR 4/ 2	10 YR 7/ 2		N 2.0		
R4 L medial aspect of shaft			10 YR 7/ 2	7.5YR 4/ 3		10 YR 2/ 1		
R4 L medial aspect of shaft			10 YR 6/ 3	10 YR 6/ 2		N 2.5		
R4 L medial aspect of shaft			10 YR 4/ 2	7.5YR 6/ 2		N 3.5		
R4 L sternal end			10 YR 5/ 4	7.5YR 5/ 3		N 2.0		
R5 L head			2.5Y 6/ 2	7.5YR 3/ 3		7.5Y 2/ 1		
R5 L tubercule			10 YR 5/ 2	7.5YR 4/ 4		2.5Y 2/ 1		
R5 L lateral aspect of shaft			10 YR 5/ 2	7.5YR 5/ 4		N 2.0		
R5 L lateral aspect of shaft			10 YR 4/ 2	7.5YR 6/ 4		N 4.0		
R5 L lateral aspect of shaft			10 YR 4/ 2	7.5YR 7/ 2		N 2.5		
R5 L medial aspect of shaft			10 YR 5/ 2	7.5YR 4/ 3		N 1.5		
R5 L medial aspect of shaft			10 YR 6/ 2	10 YR 6/ 3		5P 3/2		
R5 L medial aspect of shaft			7.5YR 2/ 2	7.5YR 5/ 4		10 YR 2/ 1		
R5 L sternal end			10 YR 4/ 4	10 YR 4/ 3		7.5YR 2/ 1		
R6 L head			10 YR 5/ 2	7.5YR 4/ 3		N 4.5		
R6 L tubercule			10 YR 5/ 3	7.5YR 5/ 3		10 YR 2/ 1		
R6 L lateral aspect of shaft			2.5Y 6/ 2	10 YR 6/ 3		N 2.5		
R6 L lateral aspect of shaft			10 YR 6/ 3	10 YR 6/ 3		10 YR 4/ 1		
R6 L lateral aspect of shaft			10 YR 6/ 2	10 YR 5/ 3		N/A		
R6 L medial aspect of shaft			10 YR 5/ 3	10 YR 3/ 3		2.5GY 2/ 1		

LEFT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R6 L medial aspect of shaft			10 YR 5/ 3	10 YR 7/ 3		2.5G 2/ 1		
R6 L medial aspect of shaft			10 YR 4/ 2	7.5YR 4/ 3		N/A		
R6 L sternal end			10 YR 3/ 3	10 YR 4/ 3		N/A		
R7 L head			10 YR 4/ 2	7.5YR 3/ 2		10 YR 3/ 1		
R7 L tubercule			10 YR 6/ 3	7.5YR 5/ 6		7.5YR 3/ 1		
R7 L lateral aspect of shaft			7.5YR 6/ 3	7.5YR 3/ 3		N 2.0		
R7 L lateral aspect of shaft			7.5YR 7/ 2	10 YR 6/ 3		5 YR 2/ 1		
R7 L lateral aspect of shaft			10 YR 5/ 2	10 YR 7/ 2		10 YR 2/ 1		
R7 L medial aspect of shaft			5 Y 5/ 8	7.5YR 3/ 3		N 1.5		
R7 L medial aspect of shaft			2.5Y 6/ 1	2.5Y 5/ 3		N 3.5		
R7 L medial aspect of shaft			7.5YR 4/ 2	7.5YR 6/ 2		N 2.0		
R7 L sternal end			2.5Y 3/ 3	7.5YR 5/ 3		2.5Y 2/ 1		
R8 L head			10 YR 5/ 3	7.5YR 3/ 2		N 1.5		
R8 L tubercule			7.5YR 5/ 3	10 YR 5/ 4		10 Y 2/ 2		
R8 L lateral aspect of shaft			10 YR 7/ 2	7.5YR 5/ 4		N 2.5		
R8 L lateral aspect of shaft			7.5YR 6/ 3	7.5YR 7/ 3	N/A	N/A		
R8 L lateral aspect of shaft			7.5YR 5/ 2	7.5YR 5/ 3	N 3.5	N/A		
R8 L medial aspect of shaft			2.5Y 4/ 1	10 YR 4/ 3		5 RP 2/ 3		
R8 L medial aspect of shaft			7.5YR 5/ 2	10 YR 6/ 4		N/A		
R8 L medial aspect of shaft			7.5YR 4/ 2	7.5YR 4/ 3		N/A		
R8 L sternal end			7.5YR 5/ 3	5 YR 3/ 4		N/A		
R9 L head			2.5Y 3/ 3	10 YR 4/ 4		10 YR 4/ 1		
R9 L tubercule			7.5YR 6/ 3	5 YR 3/ 4		N 5.0		
R9 L lateral aspect of shaft			7.5YR 7/ 3	7.5YR 7/ 3		N 2.0		
R9 L lateral aspect of shaft			7.5YR 6/ 3	7.5YR 7/ 3		N 2.0		

LEFT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R9 L lateral aspect of shaft			10 YR 4/ 2	7.5YR 7/ 3	N/A	N 2.0		
R9 L medial aspect of shaft			10 YR 4/ 2	7.5YR 4/ 3		10 G 2/ 1		
R9 L medial aspect of shaft			10 YR 5/ 2	7.5YR 7/ 2		N 4.0		
R9 L medial aspect of shaft			10 YR 3/ 2	7.5YR 6/ 2		N 2.0		
R9 L sternal end			7.5YR 5/ 3	7.5YR 5/ 3	N/A	N 1.5		
R10 L head			5 YR 4/ 2	10 YR 5/ 4		10 YR 3/ 1		
R10 L tubercule			7.5YR 6/ 3	10 YR 4/ 2		10 YR 2/ 1		
R10 L lateral aspect of shaft			10 YR 5/ 2	10 YR 4/ 2		N/A		
R10 L lateral aspect of shaft			7.5YR 5/ 3	7.5YR 6/ 3		N/A		
R10 L lateral aspect of shaft			2.5Y 5/ 1	10 YR 6/ 2		N/A		
R10 L medial aspect of shaft			10 YR 4/ 1	10 YR 5/ 3		N/A		
R10 L medial aspect of shaft			5 YR 4/ 2	10 YR 6/ 2		N/A		
R10 L medial aspect of shaft			10 YR 5/ 2	10 YR 5/ 2	N 3.5	N/A		
R10 L sternal end			10 YR 6/ 2	10 YR 6/ 4		N/A		
R11 L head			10 YR 3/ 2	7.5YR 5/ 4		7.5YR 3/ 3		
R11 L tubercule			7.5YR 4/ 3	7.5YR 3/ 3		10 YR 4/ 3		
R11 L lateral aspect of shaft			7.5YR 4/ 3	10 YR 6/ 3		7.5Y 2/ 1		
R11 L lateral aspect of shaft			10 YR 5/ 3	2.5Y 7/ 2		10 YR 2/ 1		
R11 L lateral aspect of shaft			10 YR 5/ 2	7.5YR 5/ 3		N 2.0		
R11 L medial aspect of shaft			7.5YR 4/ 2	10 YR 3/ 2		N 1.0		
R11 L medial aspect of shaft			7.5YR 4/ 2	10 YR 6/ 2		10 BG 2/ 2		
R11 L medial aspect of shaft			7.5GY 4/ 1	10 YR 6/ 3		N 2.0		
R11 L sternal end			10 YR 5/ 3	10 YR 6/ 3		N/A		
R12 L head			7.5YR 5/ 3	10 YR 6/ 3		7.5YR 2/ 3		
R12 L tubercule			7.5YR 4/ 3	7.5YR 5/ 4		2.5YR 3/ 2		

LEFT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R12 L lateral aspect of shaft			10 YR 4/ 2	7.5YR 6/ 4		7.5YR 2/ 1		
R12 L lateral aspect of shaft			7.5YR 4/ 2	10 YR 6/ 3		N 1.0		
R12 L lateral aspect of shaft			10 YR 6/ 2	10 YR 4/ 3		7.5YR 4/ 1		
R12 L medial aspect of shaft			2.5Y 4/ 1	10 YR 2/ 2		7.5B 3/ 1		
R12 L medial aspect of shaft			10 YR 5/ 2	10 YR 5/ 2		7.5YR 3/ 4		
R12 L medial aspect of shaft			2.5Y 6/ 2	10 YR 5/ 3		N 4.0		
R12 L sternal end			2.5Y 5/ 4	2.5YR 3/ 2	N/A	N/A		
R13 L head			10 YR 4/ 2	7.5YR 3/ 3	N/A	N/A		N/A
R13 L tubercule			10 YR 5/ 2	10 YR 4/ 2	N/A	N/A		N/A
R13 L lateral aspect of shaft			2.5Y 5/ 6	10 YR 4/ 2	N/A	N/A		N/A
R13 L lateral aspect of shaft			10 YR 6/ 2	10 YR 4/ 3	N/A	N/A		N/A
R13 L lateral aspect of shaft			2.5Y 5/ 2	10 YR 4/ 2	N/A	N/A		N/A
R13 L medial aspect of shaft			5P 4/3	7.5YR 4/ 3	N/A	N/A		N/A
R13 L medial aspect of shaft			10 YR 3/ 2	7.5YR 3/ 2	N/A	N/A		N/A
R13 L medial aspect of shaft			10 YR 5/ 2	7.5YR 4/ 4	N/A	N/A		N/A
R13 L sternal end			2.5Y 5/ 3	2.5Y 5/ 2	N/A	N/A		N/A
R14 L head			10 YR 5/ 2	10 YR 4/ 2	N/A	N/A		N/A
R14 L tubercule			10 YR 6/ 3	7.5YR 4/ 4	N/A	N/A		N/A
R14 L lateral aspect of shaft			10 YR 6/ 3	10 YR 7/ 2	N/A	N 3.5		N/A
R14 L lateral aspect of shaft			10 YR 4/ 2	10 YR 4/ 2	N/A	10 YR 2/ 1		N/A
R14 L lateral aspect of shaft			10 YR 5/ 1	2.5Y 4/ 2	N/A	N 2.5		N/A
R14 L medial aspect of shaft			7.5GY 4/ 2	10 YR 4/ 2	N/A	N 4.0		N/A
R14 L medial aspect of shaft			7.5YR 4/ 4	10 YR 3/ 2	N/A	N 4.5		N/A
R14 L medial aspect of shaft			10 YR 4/ 2	10 YR 4/ 2	N/A	7.5YR 2/ 1		N/A
R14 L sternal end			10 YR 5/ 3	10 YR 6/ 3	N/A	N 1.5		N/A

LEFT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R15 L head		N/A	N/A	7.5YR 5/ 3	N/A	N/A		N/A
R15 L tubercule		N/A	N/A	7.5YR 6/ 3	N/A	N/A		N/A
R15 L lateral aspect of shaft		N/A	N/A	5 Y 5/ 1	N/A	N 2.0		N/A
R15 L lateral aspect of shaft		N/A	N/A	10 YR 5/ 3	N/A	10 YR 2/ 1		N/A
R15 L lateral aspect of shaft		N/A	N/A	10 YR 4/ 2	N/A	2.5Y 3/ 1		N/A
R16 L medial aspect of shaft		N/A	N/A	7.5YR 4/ 3	N/A	N 1.5		N/A
R16 L medial aspect of shaft		N/A	N/A	2.5Y 7/ 1	N/A	10 YR 2/ 1		N/A
R16 L medial aspect of shaft		N/A	N/A	10 YR 5/ 2	N/A	N 3.5		N/A
R16 L sternal end		N/A	N/A	10 YR 4/ 2	N/A	N/A		N/A
R17 L head		N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L tubercule		N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L lateral aspect of shaft		N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L lateral aspect of shaft		N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L lateral aspect of shaft		N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L medial aspect of shaft		N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L medial aspect of shaft		N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 L medial aspect of shaft		N/A	N/A	N/A	N/A	N/A	N/A	N/A
R17 sternal end		N/A	N/A	N/A	N/A	N/A	N/A	N/A
RIGHT RIBS (cont'd)								
R1 R head			7.5YR 6/ 3	10 YR 5/ 4		5 YR 2/ 2		
R1 R tubercule			10 YR 5/ 2	10 YR 5/ 3		10 YR 2/ 1		
R1 R lateral aspect of shaft			10 YR 5/ 2	10 YR 5/ 2		7.5YR 3/ 2		
R1 R lateral aspect of shaft			7.5YR 5/ 2	7.5YR 5/ 3		7.5YR 2/ 2		
R1 R lateral aspect of shaft			10 YR 4/ 2	10 YR 4/ 3		N 2.0		
R1 R medial aspect of shaft			10 YR 5/ 1	2.5Y 4/ 2		N 2.0		

RIGHT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R1 R medial aspect of shaft			10 YR 7/ 2	10 YR 6/ 2		7.5YR 2/ 1		
R1 R medial aspect of shaft			10 YR 5/ 3	10 YR 6/ 3		N 3.0		
R1 R sternal end			10 YR 5/ 3	10 YR 6/ 3		5 YR 4/ 1		
R2 R head			7.5YR 4/ 3	2.5Y 7/ 3		5 YR 2/ 1		
R2 R tubercule			10 YR 4/ 2	7.5YR 4/ 3		7.5YR 3/ 3		
R2 R lateral aspect of shaft			10 YR 6/ 2	10 YR 6/ 3		7.5YR 4/ 3		
R2 R lateral aspect of shaft			10 YR 6/ 2	7.5YR 5/ 3		10 YR 3/ 2		
R2 R lateral aspect of shaft			10 YR 4/ 2	7.5YR 5/ 2		7.5YR 3/ 2		
R2 R medial aspect of shaft			10 YR 5/ 2	10 YR 4/ 2		7.5YR 2/ 1		
R2 R medial aspect of shaft			2.5Y 7/ 2	10 YR 6/ 3		N/A		
R2 R medial aspect of shaft			7.5YR 6/ 3	2.5Y 6/ 3		N/A		
R2 R sternal end			7.5YR 7/ 3	10 YR 6/ 4		N/A		
R3 R head			10 YR 4/ 2	7.5YR 4/ 6		10 YR 4/ 3		
R3 R tubercule			10 YR 4/ 2	5 YR 4/ 3		2.5Y 2/ 2		
R3 R lateral aspect of shaft			2.5Y 6/ 1	10 YR 5/ 3		7.5YR 4/ 3		
R3 R lateral aspect of shaft			2.5Y 7/ 1	10 YR 6/ 3		N/A		
R3 R lateral aspect of shaft			10 YR 5/ 2	7.5YR 4/ 3		N 4.0		
R3 R medial aspect of shaft			10 YR 7/ 3	10 YR 7/ 2				
R3 R medial aspect of shaft			7.5YR 6/ 2	10 YR 6/ 3		N/A		
R3 R medial aspect of shaft			7.5YR 5/ 3	10 YR 6/ 3		N 2.5		
R3 R sternal end			7.5YR 6/ 3	7.5YR 5/ 3		2.5Y 5/ 1		
R4 R head			2.5Y 5/ 2	7.5YR 5/ 4		7.5YR 2/ 1		
R4 R tubercule			2.5Y 5/ 2	7.5YR 3/ 2		N 1.5		
R4 R lateral aspect of shaft			5 YR 5/ 2	5 YR 3/ 2		7.5YR 3/ 2		
R4 R lateral aspect of shaft			5 YR 6/ 2	10 YR 6/ 3		5 YR 3/ 3		

RIGHT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R4 R lateral aspect of shaft			2.5Y 5/ 2	10 YR 5/ 2		N 2.0		
R4 R medial aspect of shaft			10 YR 5/ 2	10 YR 5/ 3				
R4 R medial aspect of shaft			7.5YR 5/ 2	7.5YR 7/ 3		N/A		
R4 R medial aspect of shaft			10 YR 5/ 2	10 YR 5/ 3		N 2.5		
R4 R sternal end			2.5YR 4/ 3	7.5YR 5/ 4		7.5YR 4/ 1		
R5 R head			10 YR 6/ 3	7.5YR 2/ 3		N/A		
R5 R tubercule			10 YR 5/ 2	5 Y 3/ 3		N/A		
R5 R lateral aspect of shaft			7.5YR 6/ 2	10 YR 5/ 2		N/A		
R5 R lateral aspect of shaft			10 YR 7/ 2	10 YR 6/ 3		N/A		
R5 R lateral aspect of shaft			10 YR 6/ 2	7.5YR 6/ 2		N 5.5		
R5 R medial aspect of shaft			5 Y 5/ 1	7.5YR 3/ 3		N/A		
R5 R medial aspect of shaft			7.5YR 5/ 2	10 YR 5/ 2		N/A		
R5 R medial aspect of shaft			10 YR 4/ 2	10 YR 7/ 2		N 5.0		
R5 R sternal end			10 YR 5/ 4	10 YR 5/ 2		10 YR 4/ 1		
R6 R head			10 YR 5/ 2	10 YR 3/ 3		10 YR 2/ 1		
R6 R tubercule			10 YR 3/ 2	7.5YR 3/ 2		2.5YR 2/ 2		
R6 R lateral aspect of shaft			10 YR 5/ 2	10 YR 4/ 2		N/A		
R6 R lateral aspect of shaft			10 YR 7/ 2	10 YR 5/ 3		N 2.5		
R6 R lateral aspect of shaft			10 YR 5/ 4	10 YR 5/ 2		N 4.5		
R6 R medial aspect of shaft			10 YR 5/ 2	5 YR 3/ 3		N/A		
R6 R medial aspect of shaft			10 YR 6/ 2	10 YR 6/ 2		N 2.5		
R6 R medial aspect of shaft			10 YR 4/ 3	10 YR 5/ 3		10 YR 3/ 1		
R6 R sternal end			2.5Y 4/ 3	7.5YR 3/ 3		N 5.0		
R7 R head			10 YR 4/ 2	7.5YR 4/ 3		N/A		
R7 R tubercule			10 YR 5/ 2	10 YR 3/ 3		N/A		

RIGHT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R7 R lateral aspect of shaft			7.5YR 6/ 2	7.5YR 5/ 3		10 YR 3/ 2		
R7 R lateral aspect of shaft			7.5YR 6/ 2	7.5YR 3/ 3		5 YR 3/ 3		
R7 R lateral aspect of shaft			5 Y 7/ 1	10 YR 5/ 2		2.5Y 2/ 1		
R7 R medial aspect of shaft			5 YR 4/ 2	10 YR 5/ 3		2.5Y 4/ 1		
R7 R medial aspect of shaft			10 YR 4/ 3	10 YR 6/ 3				
R7 R medial aspect of shaft			7.5YR 4/ 2	7.5YR 3/ 3		N 1.5		
R7 R sternal end			10 YR 3/ 3	10 YR 3/ 3		N 1.5		
R8 R head			10 YR 4/ 2	7.5YR 3/ 3		N/A		
R8 R tubercule			2.5Y 3/ 2	10 YR 4/ 2		N/A		
R8 R lateral aspect of shaft			7.5YR 5/ 2	7.5YR 5/ 3		N/A		
R8 R lateral aspect of shaft			10 YR 6/ 2	10 YR 5/ 3		N/A		
R8 R lateral aspect of shaft			10 YR 5/ 3	10 YR 5/ 2		2.5Y 5/ 1		
R8 R medial aspect of shaft			7.5YR 4/ 2	2.5Y 6/ 2		N/A		
R8 R medial aspect of shaft			10 YR 6/ 2	10 YR 6/ 3		N/A		
R8 R medial aspect of shaft			10 YR 4/ 2	10 YR 6/ 2		N 5.0		
R8 R sternal end			7.5YR 2/ 3	7.5YR 4/ 3		10 YR 4/ 2		
R9 R head			N/A	7.5YR 4/ 3		7.5GY 2/ 1		
R9 R tubercule			N/A	10 YR 4/ 3		N/A		
R9 R lateral aspect of shaft			N/A	7.5YR 4/ 3		7.5YR 4/ 3		
R9 R lateral aspect of shaft			N/A	7.5YR 5/ 3		7.5YR 3/ 1		
R9 R lateral aspect of shaft			N/A	7.5YR 4/ 3		N/A		
R9 R medial aspect of shaft			N/A	7.5YR 3/ 3				
R9 R medial aspect of shaft			N/A	10 YR 5/ 3		5 YR 2/ 2		
R9 R medial aspect of shaft			N/A	10 YR 3/ 2		N/A		
R9 R sternal end			N/A	7.5YR 4/ 3		N/A		

RIGHT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R10 R head			N/A	10 YR 6/ 3		N/A		
R10 R tubercule			N/A	10 YR 5/ 2		N/A		
R10 R lateral aspect of shaft			N/A	7.5YR 4/ 4				
R10 R lateral aspect of shaft			N/A	7.5YR 5/ 3		10 R 4/ 4		
R10 R lateral aspect of shaft			N/A	7.5YR 4/ 3		2.5YR 4/ 4		
R10 R medial aspect of shaft			N/A	7.5YR 4/ 3				
R10 R medial aspect of shaft			N/A	10 YR 5/ 3				
R10 R medial aspect of shaft			N/A	7.5Y 4/ 3		2.5Y 2/ 1		
R10 R sternal end			N/A	10 YR 4/ 3		N/A		
R11 R head			N/A	7.5YR 4/ 4		N/A		
R11 R tubercule			N/A	5 YR 3/ 2		N/A		
R11 R lateral aspect of shaft			N/A	10 YR 6/ 2		7.5YR 4/ 3		7.5YR 6/ 2
R11 R lateral aspect of shaft			N/A	2.5Y 5/ 3		7.5YR 4/ 4		10 YR 6/ 2
R11 R lateral aspect of shaft			N/A	10 YR 6/ 3		10 YR 2/ 1		10 YR 4/ 2
R11 R medial aspect of shaft			N/A	5 Y 4/ 2				2.5Y 4/ 1
R11 R medial aspect of shaft			N/A	7.5YR 5/ 3				10 YR 3/ 1
R11 R medial aspect of shaft			N/A	10 YR 5/ 3		N/A		10 YR 3/ 2
R11 R sternal end			N/A	10 YR 5/ 3		N/A		10 YR 4/ 3
R12 R head			N/A	10 YR 3/ 3				
R12 R tubercule			N/A	7.5YR 5/ 3				
R12 R lateral aspect of shaft			N/A	10 YR 6/ 3		10 YR 4/ 2		
R12 R lateral aspect of shaft			N/A	10 YR 6/ 2		N 1.0		
R12 R lateral aspect of shaft			N/A	2.5Y 7/ 2		10 YR 3/ 1		
R12 R medial aspect of shaft			N/A	7.5YR 4/ 2		N 1.5		
R12 R medial aspect of shaft			N/A	7.5YR 5/ 3		N 3.5		

RIGHT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R12 R medial aspect of shaft			N/A	7.5YR 7/ 3		2.5RP 2/ 1		
R12 R sternal end			N/A	10 YR 6/ 3		N/A		
R13 R head			N/A	7.5YR 4/ 3		10 G 4/ 3		
R13 R tubercule			N/A	10 YR 5/ 3		N/A		
R13 R lateral aspect of shaft			N/A	10 YR 5/ 2		N 2.0		
R13 R lateral aspect of shaft			N/A	10 YR 6/ 3		N 1.5		
R13 R lateral aspect of shaft			N/A	10 YR 5/ 3		N 2.0		
R13 R medial aspect of shaft			N/A	10 YR 4/ 2		N 1.0		
R13 R medial aspect of shaft			N/A	10 YR 5/ 3		7.5YR 4/ 1		
R13 R medial aspect of shaft			N/A	10 YR 6/ 2		2.5GY 2/ 1		
R13 R sternal end			N/A	10 YR 6/ 3		7.5YR 3/ 1		
R14 R head			N/A	7.5YR 3/ 3		7.5YR 3/ 1		
R14 R tubercule			N/A	N/A		N 2.5		
R14 R lateral aspect of shaft			N/A	10 YR 5/ 2		5 GY 2/ 1		
R14 R lateral aspect of shaft			N/A	10 YR 6/ 3		10 YR 3/ 1		
R14 R lateral aspect of shaft			N/A	10 YR 5/ 3		N/A		
R14 R medial aspect of shaft			N/A	10 YR 5/ 2		N 2.5		
R14 R medial aspect of shaft			N/A	10 YR 4/ 2		10 B 5/ 1		
R14 R medial aspect of shaft			N/A	7.5YR 5/ 2		2.5PB 5/ 2		
R14 R sternal end			N/A	N/A		N/A		
R15 R head		N/A	N/A	N/A		10 YR 3/ 1		N/A
R15 R tubercule		N/A	N/A	N/A		5 GY 2/ 1		N/A
R15 R lateral aspect of shaft		N/A	N/A	N/A		N 2.5		N/A
R15 R lateral aspect of shaft		N/A	N/A	N/A		N 2.5		N/A
R15 R lateral aspect of shaft		N/A	N/A	N/A		N/A		N/A

RIGHT RIBS (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
R15 R medial aspect of shaft		N/A	N/A	N/A		10 YR 2/ 1		N/A
R15 R medial aspect of shaft		N/A	N/A	N/A		N 5.5		N/A
R15 R medial aspect of shaft		N/A	N/A	N/A		N/A		N/A
R15 R sternal end		N/A	N/A	N/A		N/A		N/A
R16 R head		N/A	N/A	N/A	N/A	5 YR 4/ 1	N/A	N/A
R16 R tubercule		N/A	N/A	N/A	N/A	7.5YR 2/ 1	N/A	N/A
R16 R lateral aspect of shaft		N/A	N/A	N/A	N/A	10 YR 2/ 1	N/A	N/A
R16 R lateral aspect of shaft		N/A	N/A	N/A	N/A	N 6.0	N/A	N/A
R16 R lateral aspect of shaft		N/A	N/A	N/A	N/A	N 4.0	N/A	N/A
R16 R medial aspect of shaft		N/A	N/A	N/A	N/A	10 YR 2/ 1	N/A	N/A
R16 R medial aspect of shaft		N/A	N/A	N/A	N/A	N 6.5	N/A	N/A
R16 R medial aspect of shaft		N/A	N/A	N/A	N/A	N 3.5	N/A	N/A
R16 R sternal end		N/A	N/A	N/A	N/A	N/A	N/A	N/A
STERNEBRAE								
dorsal surface of segment one			10 YR 7/ 3	7.5YR 5/ 3		7.5YR 2/ 1		7.5YR 5/ 1
ventral surface of segment one			7.5YR 5/ 2	10 YR 6/ 3		N 1.0		10 YR 5/ 2
dorsal surface of segment two			10 YR 6/ 2	10 YR 4/ 3		7.5YR 2/ 1		10 YR 6/ 3
ventral surface of segment two			5 YR 4/ 1	10 YR 7/ 2		10 YR 2/ 2		7.5YR 7/ 3
dorsal surface of segment three			10 YR 6/ 2	7.5YR 3/ 2		7.5YR 2/ 3		N/A
ventral surface of segment three			7.5YR 5/ 1	10 YR 7/ 2				N/A
dorsal surface of segment four			10 YR 5/ 3	10 YR 6/ 3		N/A		N/A
ventral surface of segment four			5 YR 4/ 1	2.5Y 8/ 2		N/A		N/A
dorsal surface of segment five		N/A	7.5YR 6/ 2	7.5YR 7/ 2		N/A		N/A
ventral surface of segment five		N/A	5 YR 4/ 2	7.5YR 4/ 2		N/A		N/A

STERNEBRAE (cont'd)	pig 1	pig 2	pig3	pig 4	pig5	pig6	pig7	pig8
dorsal surface of segment six		N/A	N/A	N/A		N/A		N/A
ventral surface of segment six		N/A	N/A	N/A		N/A		N/A
dorsal surface of segment seven	N/A	N/A	N/A	N/A		N/A	N/A	N/A
ventral surface of segment seven	N/A	N/A	N/A	N/A		N/A	N/A	N/A

APPENDIX F:

Macroscopic Mimicry Evaluation Test Sheets

#	Bone	ID Star	Natural Decomposition	Probable Natural Decomposition	Undetermined	Probable Heat Trauma	Heat Trauma
[redacted]							
2	Cranium	Gold	1	2	3	4	5
[redacted]							
4	Innominate-left	Red	1	2	3	4	5
[redacted]							
6	Innominate-left	Gold	1	2	3	4	5
[redacted]							
8	Femur-right	Gold *	1	2	3	4	5
[redacted]							
10	Femur-left	Gold	1	2	3	4	5
[redacted]							
12	Fibula	Red	1	2	3	4	5
[redacted]							
14	Fibula	Red	1	2	3	4	5
[redacted]							
16	Fibula	Blue	1	2	3	4	5
[redacted]							
18	Calcanei-right	Silver	1	2	3	4	5
[redacted]							
20	Astragulus-right	Blue	1	2	3	4	5
[redacted]							
22	Lumbar Vertebrae	Red	1	2	3	4	5
[redacted]							

#	Bone	ID Star	Natural Decomposition	Probable Natural Decomposition	Undetermined	Probable Heat Trauma	Heat Trauma
24	Lumbar Vertebrae	Silver	1	2	3	4	5
25	Rib-right	Gold*	1	2	3	4	5
26	Rib-right	Red	1	2	3	4	5
27	Radius+Ulna-right	Green	1	2	3	4	5
28	Radius+Ulna-left	Silver	1	2	3	4	5
29	Radius+Ulna-right	Gold*	1	2	3	4	5
30	Radius-left	Red	1	2	3	4	5
31	Tibia-right	Silver	1	2	3	4	5
32	Tibia-right	Gold*	1	2	3	4	5
33	Tibia-right	Red	1	2	3	4	5
34	Tibia-left	Red	1	2	3	4	5
35	Tibia-right	Green	1	2	3	4	5
36	Tibia-left	Green	1	2	3	4	5
37	Tibia-right	Gold	1	2	3	4	5
38	Humerus –left	Green	1	2	3	4	5
39	Humerus-right	Gold*	1	2	3	4	5
40	Humerus-left	Green	1	2	3	4	5
41	Metacarpal 3-left	Gold*	1	2	3	4	5
42	Metacarpal 4-left	Gold*	1	2	3	4	5
43	Metacarpal 3-right	Red	1	2	3	4	5
44	Metacarpal 4-right	Red	1	2	3	4	5
45	Metacarpal 3-right	Blue	1	2	3	4	5
46	Metacarpal 4-right	Blue	1	2	3	4	5

#	Bone	ID Star	Natural Decomposition	Probable Natural Decomposition	Undetermined	Probable Heat Trauma	Heat Trauma
47	Metacarpal 3- left	Blue	1	2	3	4	5
48	Metacarpal 3-left	Gold	1	2	3	4	5
49	Metacarpal 4-left	Gold	1	2	3	4	5
50	Metacarpal 4-left	Silver	1	2	3	4	5

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