Veterinary Forensics

Giving a Voice to Those Who Cannot Speak For Themselves

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Honors Thesis
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Précis

With television shows like *CSI: Crime Scene Investigation*, *NCIS* and *Bones* gaining popularity, the general public has become fascinated by the worlds of forensic science and law enforcement. Similarly, with shows like *Animal Cops* and *Animal Precinct*, the public has also become aware of the gravity of animal cruelty. It only makes sense then, that the forensic techniques used in human crime investigation would be modified to use in the investigation of crimes of animal cruelty. Dr. Melinda Merck and the American Society for the Prevention of Cruelty to Animals (ASPCA) have taken up the tasks of creating and leading the field of veterinary forensics as it becomes more and more necessary to provide forensic evidence when prosecuting those who abuse animals.

This study compares and contrasts the similarities and differences that exist between veterinary forensic cases and human forensic cases. Which techniques are preserved directly from human forensic cases and which must be modified in order to be used in animal abuse cases? The study was conducted using literary as well as field research. Since veterinary forensics is still relatively new, specific literary research is limited, but current. The field research consisted of a series of lectures as well as a unique opportunity in which the author was able to walk through the steps of an actual investigation. This study also considers the link between animal cruelty and other violent crimes and the importance of prosecuting animal cruelty.

The results show that, while many of the techniques used in human forensic cases are very similar to the ones used in veterinary cases, most techniques must be modified in some way in order make up for the differences between a human and an animal victim. This is
usually due to the differences in the anatomy and behavior of humans and animals. The study also shows that animal cruelty is a common childhood occurrence among domestic abusers and serial killers.

Veterinary forensics is a growing field that holds many opportunities for research. As the field becomes more prominent, new fields of specialization will open up, giving investigators the chance to become experts in one specific aspect of veterinary forensics and each of these new areas of expertise will provide research opportunities. The melding of human and veterinary forensic science will ultimately benefit society, protecting people and animals alike.
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Introduction

Animal cruelty is one of those crimes that people prefer to pretend doesn’t happen. For most, it is hard to think of doing harm to something as innocent as a puppy or a kitten. Unfortunately, these crimes do occur, and it is because of them that the field of veterinary forensics was born. According to Dr. Melinda Merck, the only current full-time forensic veterinarian and leader of the field of veterinary forensics, “Animal cruelty is the act of abusing a helpless victim who has no recourse and no voice. It is our role, as veterinarians, to be their voice and seek justice for their suffering” (Merck xxi).

Since there is no national database of animal-cruelty statistics (Sinclair 19), it is hard to determine how many of these crimes are committed annually. One might look up the number of animal cruelty prosecutions per state, but the definition of animal cruelty varies from state to state, as does the prosecution. Even when felony anti-cruelty laws exist, the sad truth is that many crimes of animal cruelty go unreported or unprosecuted. Any number that we could come up with would be a vast underestimate of the true number of crimes committed.

State laws against animal cruelty can vary from general to specific, including definitions of the term ‘animal.’ If no definition is given, the term is up for interpretation, which calls into question which animals are protected. State laws also vary in the extent to which they prosecute crimes of animal cruelty. Crimes are classified based on the length of punishment they are subject to. If the length of imprisonment is greater than one year, the crime is classified as a felony, if it is under one year but over five days it is a misdemeanor and if it is under five days or no imprisonment at all it is an infraction (18 USC 3559). Having a felony conviction for animal cruelty is very important as it sends the message that animal cruelty is
taken seriously as a crime. All fifty states classify some form of animal cruelty as at least a misdemeanor and as of April of 2008, forty-four states and the District of Columbia classified specific animal cruelty crimes as felonies (Gianotto). For example, in Washington State’s animal cruelty law, ‘animal’ is defined as “every creature, either alive or dead, other than a human being” (RCW 16.52.205, 2006). Washington also classifies animal cruelty as a class C felony and includes such acts as infliction of pain or suffering, starvation, dehydration, and sexual misconduct (RCW 16.52.205, 2006). In Idaho, however, ‘animal’ is limited to vertebrates, excluding humans, and ‘companion animal’ is defined as “animals commonly kept as pets,” including dogs, cats, rabbits and birds (25 Idaho Statues 3502). Idaho classifies animal cruelty as a misdemeanor and includes such acts as intentional pain or suffering, abandonment and confinement in unsanitary conditions (25 Idaho Statutes 3502).

The American Society for the Protection of Animals (ASPCA) was founded in 1866 “to provide effective means for the prevention of cruelty to animals throughout the United States” (ASPCA, “About Us”). The ASPCA provides shelter for stray animals looking for new homes, treats sick and injured animals in its many hospitals throughout America and is the leading organization behind the legislation of animal-cruelty laws. Founder Henry Bergh was the first to lobby for animal cruelty laws, supporting the first effective anticruelty law in New York State, which was put into effect just days after founding the ASPCA (Lane 18, 115). Since then, the ASPCA has lobbied for many important animal welfare acts. By the end of 2006, the ASPCA had supported 47 state bills, given testimony at 125 hearings and sent out 230,000 letters in response to federal legislation (Lane 118).

Dr. Melinda Merck got involved with the investigation of animal cruelty cases when she
Janel Brown Veterinary Forensics joined Georgia Legal Professionals for Animals in 2003 (Veterinary Forensics). She began researching human forensics to find ways to mold it to fit her needs in veterinary forensic cases and she began giving seminars on veterinary forensic investigations. She eventually joined the ASPCA as the first ever full-time forensic veterinarian and is now the Senior Director of Veterinary Forensics. In December of 2007, the ASPCA introduced the first Mobile Animal Crime Scene Investigation Unit, which is operated by Dr. Merck; in the fully-stocked, customized van, Dr. Merck travels around the country investigating animal cruelty cases (The Associated Press).

Although veterinary forensics is still in its early years, forensic science has a lengthy background. Physicians, who were naturally some of the first people to come in contact with the dead, began early on to use their knowledge of the medical field to solve murders (Nickell 6). An autopsy performed by a physician confirmed that only one of the twenty-three wounds that were inflicted upon Julius Caesar in 44 BC was fatal (Tilstone 3). *HsiDuan Yu* ("The Washing Away of Wrongs") dates back to 1248 and describes a Chinese physician’s theories about how to determine cause of death (Nickell 6). The nineteenth century’s Industrial Revolution brought many important inventions to the scientific community. The oil-immersion lens, invented in 1840 by Italy’s Giovanni Battista Amici, is still used today to analyze microscopic evidence (Tilstone 4). In the late nineteenth century, Sir Arthur Conan Doyle helped to popularize forensic investigation of crimes through his fictional character, Sherlock Holmes, who used many investigative techniques such as fingerprinting and gun testing; he even used some techniques before they were actually discovered by forensic scientists (Tilstone 1). For example, in *A Study in Scarlet*, which was published in 1887, Holmes discusses the use of

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identifying blood by precipitation approximately 15 years before forensic scientists made the discovery (Tilstone 1).

Around 1890, Sir Francis Galton of England introduced the fingerprint classification system that we still use today (Tilstone 5). Until then, anthropometry (the measurement of physical characteristics such as height, weight and ear shape) had been widely used to individualize people and many considered the use of fingerprints controversial due to the lack of understanding about the subject (Tilstone 6). Eventually, fingerprinting was accepted by the public and is still used to identify suspects. The first computerized fingerprint database was used by Scotland Yard beginning in 1984 (Tilstone 35). After that, the use of fingerprint databases grew until, in 1999, the Integrated Automated Fingerprint Identification System (IAFIS) was put into use; the database has since grown to contain over 47 million individuals (Tilstone 34).

In 1901, Karl Landsteiner published his work about ABO blood groups, which, with some adjustments by Leon Lattes, became the first process by which forensic scientists were able to narrow down the identity of a suspect based on blood evidence (Tilstone 10). In the mid-1980s, with the development of restriction fragment length polymorphism (RFLP), the ability to test samples of blood, semen, and other bodily substances containing DNA became available (Tilstone 119). In the early 1990s, RFLP tests were joined by polymerase chain reaction (PCR) tests, which are quicker and more sensitive, but produce less discriminatory results (Tilstone 120; Nickell 203). With the continued development and expansion of the DNA database called the Combined DNA Index System (CODIS), retrieving information about a suspect from evidence left at a crime scene has become much simpler (Tilstone 28).

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These days, jurors expect prosecutors to present the types of forensic evidence that they see on television. Due to the success of shows like the CSI series, people have gained unrealistic ideas about how forensic investigations work. While the people who produce CSI normally try very hard to get the forensic tests correct (Goode 75), it is not possible to fit exact details into one hour time slots and they do have to simplify in a lot of areas. These shows have “spawned what many scientists and lawyers call ‘The CSI Effect,’ in which forensic science is seen as fascinating, exhaustive, and infallible” (Mardis 12). Some educators are even taking advantage of the popularity of the show and using it as a tool to teach science (Duncan 38). While this seems like a good idea because the students could become aware of the unrealistic nature of the techniques used on the show, in a study of high school students, more students thought that CSI was realistic after the workshop than before it (Duncan 41). This most likely does not reflect on the teacher’s ability or knowledge, but may strengthen the argument that television shows have become engrained into the culture so effectively that it is hard to remove them from the people’s minds, even when scientific evidence is placed before them.

The public has come to expect quick and definite results out of forensic tests. In reality, these tests take time and do not point out the exact culprit but help to narrow down the suspect pool by eliminating suspects until the chances of the evidence being linked to another person by random chance are slim to none. In order to successfully prosecute those who abuse animals, it is up to veterinary forensics to provide the means to accrue the evidence necessary to convince a jury that the suspect committed the animal cruelty. By taking the skills and techniques used in human forensics cases and molding them for use in animal cruelty cases, forensic veterinarians can provide a voice for those who cannot speak for themselves.
How did the field of veterinary forensics evolve as the public became more aware and less tolerant of animal cruelty? How do the techniques used in veterinary forensic cases compare and contrast with the methods used in human forensic cases and what is the connection between animal cruelty and other violent crimes?

**Methodology**

Answering the research question was done primarily through literary research, using information derived from books and journal articles. The sources were chosen based on their relevance to the field of veterinary forensics, forensic science in general or animal cruelty. Nearly all sources on veterinary forensics are current, as veterinary forensics is a relatively new field of investigation. There are a few books exclusively dedicated to the field of veterinary forensics, but most of my sources are on larger topics and may cover veterinary forensics in only a small section of the entire piece. Some sources discuss human forensic techniques that can be modified or used directly in veterinary forensic investigations. Other sources discuss animal cruelty, its connections with other criminal acts and its history.

I also used information that I gathered from two seminars. The first seminar I attended was the first annual conference of what soon became the International Veterinary Forensic Science Association (IVFSA) in April of 2008. At this conference, numerous speakers including Dr. Melinda Merck and Dr. Randall Lockwood of the ASPCA conducted lectures sharing information from their fields of expertise. The second was a workshop held in October of 2008 in which mock crime scenes were erected so that the students could walk through the steps of working a burial crime scene.
Discussion

Background on Forensics

Many people mistakenly equate the terms ‘forensic science’ and ‘crime scene investigation.’ Although crime scene investigation is a large and important area of forensic science, the two are not the same thing. Forensic science refers to any scientific field that is used to investigate crimes and prosecute criminals (Nickell 1; Merck xix). The fields that can be included in forensic science include toxicology, psychology, medicine and anthropology as well as many others (Nickell 1). Crime scene investigation can also be broken down into areas of specialization, including fingerprints, guns, DNA and blood spatter analysis. In forensic investigations where a human is the victim and/or suspect, many different people will work the case, each with their own specialization. These people each bring detailed information about one area of expertise to the case. Currently, the veterinarian must fill nearly all of these roles in animal cruelty cases. It is the veterinarian’s job to be the crime scene investigator, coroner and expert witness in these cases and to collect, document and interpret the evidence (Merck xix). In some cases, experts may be consulted, but for the most part there is only the veterinarian. Animal control officers are often acquainted with the collection of injured or dead animals, but may not be familiar with forensic procedures. In very large or high-profile cases or when weather threatens to ruin evidence, volunteers may be brought in to assist with the crime scene investigation. These can include veterinary technicians, animal control officers and shelter volunteers. They will often be people who have little to no background in the investigation of crimes and will need to be briefed by the veterinarian and/or any other forensic investigators at the scene. It is also possible that they will be familiar with investigative

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techniques but need to be instructed on how to apply them to animal cruelty cases.

**Reporting the Crime**

Before a case can be started, the authorities must be made aware that a crime has been committed. Usually, a reporting party calls the police to the scene of the crime. In human cases, this could be someone who heard a gunshot, a person who expects that his or her neighbor is the victim of domestic abuse or someone who came across a body in a ditch. In animal abuse cases, this could be done by a family member who sees the abuse, a neighbor who thinks that something is wrong with the dog on the other side of the fence, or a veterinarian that suspects an animal is being abused. Veterinarians, like human medical doctors, should be aware of the signs of abuse and what their states’ laws are concerning the reporting of suspected abuse (Yoffe-Sharp 735). They should also know who they should report their suspicions to and should have policies in place at their clinics (Yoffe-Sharp 735). Even if it is not mandated by law, it is vital for veterinarians to report any suspicions of animal abuse that they may have to the authorities so that they can be evaluated to determine if cruelty is occurring.

**Crime Scene Investigation**

The investigation of the crime scene is the first step in a case and is one of the most important (Merck 19). Without the evidence, there is nothing to convince the jury that the crime even happened. In both human and veterinary forensic investigations, steps must be taken to ensure that all of the evidence is properly identified, documented, collected and preserved.

The first official on the scene in a human forensic case is often a police officer, who will
then call in a crime scene unit (Nickell 23). If there is an animal at the scene, a veterinarian should then be called in.\(^1\) According to Dr. Melinda Merck, “The presence of an injured or deceased animal at a crime scene should obviate the need for a veterinarian to be present. However, in reality, a veterinarian’s presence at a crime scene is more the exception than the rule” (Merck 5). Veterinary forensic investigators often lose valuable evidence because those who first arrive at the scene do not recognize the importance of maintaining the crime scene in the case of animal cruelty. Because animal cruelty cases are not always recognized immediately, the forensic veterinarian may not be called in until after the evidence has been collected and the crime scene released. This leaves the veterinarian at the disadvantage of having to interpret evidence that may not have been collected properly. Often, investigators will present a veterinarian with crime scene photos and expect her to determine cause of death. Unfortunately, even if the cause of death is evident in the photos, without performing an examination the veterinarian cannot prove cause of death in court (Merck 6). It is also possible that valuable evidence goes uncollected in these cases, leaving the veterinarian without the means of proving who committed the crime. This is unlikely in traditional forensic cases because investigators in these cases are usually called in right away and play a substantial role in collecting and preserving evidence.

In both human and veterinary forensic cases, the initial documentation of the crime scene is very similar. First, the crime scene must be secured (Dale 34). This means that, once the proper authorities arrive, the scene must be roped off and only official personnel should be allowed to enter. An attendance log should be established to keep track of when people enter

\(^1\) Appendix A: Request for Crime Scene Assistance Form
and exit the crime scene and which tasks they perform (Dale 34). It is important to know who had access to the crime scene to establish chain of custody. Chain of custody is a list of who has contact with the evidence from the moment it is collected until it enters the court room (Tilstone 100). Chain of custody, or lack thereof, can make or break a case. If evidence is undocumented for any period of time, it could be compromised. Evidence without proper chain of custody documentation is considered tainted and will be challenged in court.

The weather at the crime scene should be documented, including temperature, humidity, etc. (Merck 21). This information will be important to take into consideration when analyzing a body or wound, as in human forensic cases, but it plays another role in animal cruelty cases as well. Leaving an animal in an environment that is either too cold or too warm is a form of neglect and temperature information will be important for building a case.

At any crime scene, be it human or animal, photography is one of the most important steps in the crime scene investigation (Merck 21; Dale 36). Photographs are used to keep the crime scene intact for the jury. Since the evidence is going to eventually be removed from the scene, photographs are important for placing things where they were when the crime occurred. If at all possible, the first person to respond to the crime scene should start by taking a photograph. Photographs are taken from general to specific, starting with the overall crime scene and zooming in to close-ups of specific pieces of evidence (Dale 36; Merck 21). This will help to place the evidence in its proper position in the crime scene after it has been removed. Photographs should be logged so that it will be easy to refer back to them later. When using a digital camera, photos should never be deleted, even if they are of poor quality. If photos are...

2 Appendix B: Crime Scene Log
deleted, it might be inferred that evidence was tampered with by the investigators and the case could be lost on a technicality. A hand-drawn diagram of the scene should accompany these photographs, with labels including coordinates indicating where evidence was located (Dale 45). Photographs cannot accurately depict distance, so the diagram aids in placing evidence items in their proper geographical locations. Photographs and diagrams are used in conjunction when presenting the case in court.

Unlike a forensic investigator at a human crime scene, who will most likely be in charge of only one task in the investigation of the scene, the veterinarian has many different tasks to perform at an animal cruelty crime scene. Working with any investigators already on the scene, the veterinarian should direct investigators and assist with the collection of evidence related to the animal. If the animal is alive, the veterinarian should properly document, photograph and examine it for injuries and illnesses. As with human victims, the priority is to ensure that the victim remains alive and well. In the event that the victim is deceased, proper care must be taken to preserve the body (Merck 20). An animal body will decompose differently than a human corpse, so a veterinarian will be responsible for determining time of death and cause of death. As with a human corpse, the body temperature must be taken at the scene and entomological evidence must be collected (Merck 20). This information will help to narrow down time of death.

In animal cruelty or neglect cases, it is important to document the conditions that the animals were kept in. The condition of the food and water should be carefully documented by the veterinarian (Merck 22). It is important to not only note the presence or absence of food.

3 Appendices C – F: Sketching the Crime Scene
4 Appendix G: Forensic Entomology Animal Data Form
and water, but also the availability (Merck 22). Food is only useful if the animal can reach it and
the presence of food does not necessarily rule out neglect. If the animal cannot get its head far
enough into a bucket to get to water, for example, the mere presence of the water does not
help. With dog cruelty cases where the animals are kept outside, it is important to document
the conditions of the shelter if any exists and also to document the type, length and weight of
any chains or ropes used to tie up the dog (Merck 22). Embedded collars can occur if the ties
are too tight.

In cases of violent crimes, concerning humans or animals, blood stains can provide a lot
of details about the series of events that occurred during an attack. The pattern of blood
stains, shape and size of the drops and voids in blood stains can tell a trained blood stain
analyzer many different things about where the victim and suspect were standing, how many
blows occurred and what type of weapon was used (Merck 23). Due to the differences in
anatomy and behavior between humans and animals, blood stain analysis can differ greatly in
animal abuse cases than human forensics cases. For example, where human victims tend to
cover and apply pressure to a bleeding wound, an animal may lick the wound or actually lick up
a blood pool. Injured animals also tend to shake their heads and bodies, which creates blood
spatter that is not related to the actual event of the injury (Merck 24). Also, animals tend to
walk on all fours, so the majority of blood stains on vertical surfaces will be at a lower level in
animal cruelty cases than in most human forensic cases.

Dog-fighting cases present a unique challenge when it comes to blood stain analysis.
Dog fighting pits will most likely contain numerous overlapping blood stains from multiple dogs
(Merck 26). They may also contain blood samples from dog owners who were injured by the
dogs. Some of these stains could be fresh, while others may be months old. Singling out specific blood patterns may prove to be a hopeless task. If at all possible, samples should be collected from single drops so as to decrease the chance of getting multiple DNA profiles in the same sample (Merck 26).

All physical evidence must be photographed, collected, labeled, documented and transported to the forensic lab. The methods for evidence collection are very similar in both human and veterinary forensic cases. All items should be placed in paper containers so that moisture does not ruin the evidence (Dale 38; Merck 35). Evidence tape must completely seal off the container so that the evidence is not contaminated and the tape must be numbered, initialed and dated (Dale 39; Merck 36). Wet evidence, such as blood, should be collected using sterile swabs and then placed into a paper bag or blood tube (similar to a test tube with a lid) and properly labeled with evidence number, date and the collector’s initials (Dale 60; Merck 35). Chain of custody sheets should be started for each piece of evidence. These steps ensure that the integrity of the evidence cannot be questioned by the defense attorney and are very important in crime scene investigation. If at all possible, two people should perform these steps as a team.

In animal cruelty cases, the body of the animal is handled similarly to the body of a human. Paper bags are placed on all feet to preserve evidence and then the body is carefully wrapped in a clean white sheet and placed in a body bag or plastic bag (Dale 93; Merck 20). Valuable evidence can be obtained from the body of a deceased victim, so all precautions should be taken not to lose any of the evidence. The body should be handled with care and

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3 Appendix H: Items Collected Worksheet
4 Appendix I: Evidence Receipt Form
transported for necropsy as soon as possible.

Once all the evidence is processed and removed from the scene, the crime scene is released. Since no further evidence can be extracted from a scene after the scene is released, investigators must be careful to collect everything the first time.

*Grave Excavation*

The initial excavation of a grave is identical for human and animal cases. The grave is identified by disruption of the soil in a certain area, discoloration, indentations, piles of excess dirt, or damage to surrounding vegetation (Merck 28; Nickell 272). Once identified, the gravesite is diagrammed, evidence surrounding the grave is collected and then the grave is emptied systematically using a grid system (Merck 28; Nickell 273). All the dirt that comes out of the grave must be sifted and searched for evidence (Merck 28; Nickell 273). Any evidence found in or around the grave is plotted on diagram using one of the corners of the grid as a reference point (Merck 28).

Once the body is reached and it has been determined that the remains belong to an animal and not a human, a veterinarian should be contacted. All bones must be identified and plotted on a diagram before they can be removed from a grave and most investigators will not have the knowledge of animal anatomy necessary to do this properly. The excavation of the grave then proceeds as it would during a human forensic case. The remains are carefully uncovered using brushes to avoid damage, plotted on the diagram, removed and placed on a sheet next to the grave in anatomical position. In human cases, bones are given to a forensic anthropologist for examination, who will use them to approximate age, sex, race, height and

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7 Appendices J – K: Bone Diagram and List
cause of death if possible (Nickell 273). In animal cases, the bones are given to the veterinarian to examine.

**Processing the Evidence**

Once the crime scene has been investigated, the evidence is transported to the lab for processing. Hair samples and fingerprints are compared, blood stains are analyzed and conclusions are made. The body of the victim often provides the most useful evidence in the investigation of violent crimes as it can contain trace evidence. When examined by a trained individual, the condition of the body can tell the story of the crime.

**Live Animal Examination**

A live animal examination will be unique to animal cases for the simple reason that the animal cannot speak. In human abuse cases, a living victim is treated as a witness and questioned about the event. The victim gives a recount of what he or she remembers from the event or from the moments leading up to the event, sometimes in detail and sometimes not. Injuries are documented and connected to the incidents based on the victim’s memory of the event and trace evidence is collected. In the case of rape, a sexual assault evidence (SAE) kit will be collected, including vaginal, oral and rectal swabs (Dale 122).

An animal victim is unable to recount the events that occurred, so the animal must be examined thoroughly by a veterinarian, who can then attempt to reconstruct the abuse. Live animal examinations are documented on a series of specific forms.\(^8\) A complete physical examination is performed, noting any normal and abnormal findings (Merck 38). Radiographs are taken to locate any current or past fractures (Merck 40). The presence of old and healing

\[^8\] Appendix L: Body Condition Assessment Form; Appendix M: Skin Condition Forms; Appendix N: Condition of Haircoat and Nails Forms
wounds in conjunction with current wounds suggests continued abuse. Blood, urine and fecal samples should be collected and tested for poisons, bacteria and parasites.

If any treatment is performed, i.e. for wounds, undernourishment or parasites, the recovery of the animal is documented as well (Merck 38). This helps to prove in court that the malady was from a lack of veterinary care and could have been avoided, which indicates neglect and cruelty. If a pet owner subjects an animal to unnecessary suffering and the veterinarian can provide proof that veterinary care would have mitigated the situation, then cruelty has occurred.

Necropsy

A human autopsy is performed by a medicolegal examiner: either a coroner or a medical examiner, depending on the area (Dale 86); in an animal abuse case, a necropsy is performed by a veterinarian. In both an autopsy and a necropsy, the main goals are to determine cause, manner and time of death, but due to anatomical and physiological differences between humans and animals, some of the methods differ. In both cases, notes from the examinations are taken on specific forms, which differ between human and animal cases. For human cases, a different sheet is used based on sex and for animal cases, a different sheet is used based on species.

In an autopsy, the first step is to attempt to determine the individual’s identity (Dale 91). In most animal cruelty cases, the owner is the important person to identify and locate. This is because the owner is usually the first suspect in an animal cruelty case. If the owner has

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9 Appendix O: Weight Change Form
10 Appendix P: Necropsy History Form; Appendix Q: Necropsy Worksheet; Appendix R: External Wounds Forms; Appendix S: Exam/Necropsy Report; Appendix T: Preliminary Veterinarian Statement; Appendix U: Final Veterinarian Statement
not been identified at the crime scene, the dog should be checked for an identifying collar or microchip. In a necropsy, identification of the animal is not always a top priority. The individual identity is not as important in an animal cruelty investigation because there is no next of kin to alert. Animals do not have drivers’ licenses, phone records or criminal histories so identifying the dog by name is not always necessary because it will not lead to any more information about the victim. This is not to say that the identity of the individual animal is not significant or valuable. Placing a name with a victim personalizes the case; this can have either positive or negative effects, depending on the investigator. The investigation of deaths and abuse, whether it is concerning humans or animals, is a very emotional job. For some, knowing the identity of the victim is part of the driving force behind working to find the person who committed the crime against a specific victim. For others, it is easier to work if they back off and try not to get emotionally involved with the victim. It just depends on the working style of the investigator and neither style is better than the other. Also, juries will want to see that the investigator is sympathetic and identifying the animal by name, if possible, will help when presenting the case to a court.

Radiographs are taken in both human and animal cases to identify any damage to the bones or to locate any injuries that are not evident from the outside (Dale 91; Merck 46). Then, an external examination is performed to check for trace evidence (Dale 93; Merck 47). Since the suspect usually has direct contact with a victim at some point during the crime, important trace evidence from the suspect may be found on the body. This evidence can be hair, skin, blood, fibers, etc. The fur of animals, as compared to human skin, presents a unique difference in the search for trace evidence. One advantage of the victim having fur is that trace evidence
can become more easily lodged in the fur; a disadvantage is that it will often be difficult to locate the trace evidence (Merck 59). The body should be carefully and systematically checked for trace evidence in the fur. The coat may be combed on top of a large piece of paper to attempt to dislodge any trace evidence from the fur. Also, the animal should be checked for any external parasites that may indicate neglect.

Livor mortis, or lividity, should be documented to determine whether the body was moved postmortem. After death, without the heart to pump it through the body, blood succumbs to gravity and pools in certain areas, including the abdomen and limbs. This results in a discoloration of the skin on the surface of the body that was positioned toward the ground after death (Nickell 249). If the body is moved after death, lividity will be uneven or misplaced. For example, if a body is found face down but lividity is on the back, this indicates that the body was flipped over after death. Lividity occurs after variable lengths of time after death, depending on the size and species of the body in question. It is important to know if a body has been moved from the position it was in at the time of death, because this may indicate that there is another crime scene to locate and investigate.

One difference between the body of an animal and the body of a human that presents a problem in animal cruelty cases is the lack of a fingernail bed. Although both humans and animals may use their nails to fight back against an attacker, only humans can carry trace evidence under their fingernails. Also, animals tend to lick their feet, which may result in the dislodgement of any trace evidence (Merck 60). Since animal nails do not have a fingernail bed, the pads of the feet must be checked for any trace evidence.

After the external examination, an internal examination should be performed. The
methods for performing the examination are quite similar between autopsies and necropsies. An incision is made along the midline of the abdomen and thorax and the internal organs are removed and inspected for injuries or abnormalities (Dale 94; Merck 47). The organs should be measured and weighed for irregularities that could indicate disease or poisoning. Since organs of humans and organs of animals are different sizes, this part of the process is different for necropsies. The veterinarian must be familiar with the normal values for each of the organs so that anomalies can be recognized. Samples from each organ should be taken, as well as blood, urine and stomach content samples, to be tested for poisons, biological agents, parasites, etc. (Dale 94; Merck 47). Although medicolegal examiners usually order toxicology tests, parasites will probably not be tested for unless there is reason to believe they are present and played an important role in the death of the person. In animal neglect cases, it is especially important to test for parasites because the presence of parasites indicates that the owner has not provided sufficient veterinary care for the animal, proving neglect.

After a necropsy, the body of an animal is kept refrigerated until the case is no longer active (Merck 52). Conversely, after an autopsy the body is usually embalmed, released to the family and buried (Dale 96). If further information is needed from the body, the grave is exhumed and the body is reexamined (Dale 96). If the body has been cremated, there is little chance that any more information can be obtained. Due to religious and sentimental ceremonies that accompany human deaths, it is often difficult to retain a human body for a long period of time unless there is no family or they cannot be located. This means that a medicolegal examiner must be careful to retrieve all information from the body at autopsy, as

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11 Appendix V: Fixed Histology Checklist
he or she may not have another chance to examine the body.

**Determining Time of Death**

Contrary to the way it is portrayed by shows like CSI, time of death cannot be directly determined at the crime scene simply by taking a liver temperature or feeling the stiffness of the body. Time of death is calculated by first estimating the postmortem interval, or the amount of time that has elapsed since death (Merck 241). In both human and animal cases, determining postmortem interval and time of death can be crucial to a successful prosecution. Determining time of death can help prove that the suspect’s alibi is false or can support a witness’ statement (Merck 241). Postmortem interval is estimated by integrating information from a variety of changes that the body undergoes after death, including rigor mortis, algor mortis and decomposition (Merck 242; Nickell 249).

After death, metabolism ceases and energy supplies to the muscles are depleted causing muscles to stiffen (Merck 244). The muscles relax again later in the decomposition process (Merck 244; Nickell 250). This process is referred to as rigor mortis and happens in both human and animal bodies, but will happen at different rates due to the differences in size and metabolism rates between species. The veterinarian will be able to estimate postmortem interval based on how far along the body is in the process of rigor mortis. Since the process can be affected by temperature of the crime scene (Merck 244), estimating the time of death from rigor mortis involves careful calculations that take all the variable factors into consideration.

Algor mortis is the term used to describe the loss of temperature from the body that generally occurs after death (Merck 245). During life, metabolic processes in the body work to ensure that body temperature is kept at a stable level. After death, when these processes...
cease, the body tends to cool off. The cooling process is affected by many factors including the ambient temperature and the size of the body. Smaller bodies will cool at a faster rate, but if the body is left in a high temperature environment or in direct sunlight, it may actually heat up after death (Merck 245). This process occurs at different rates in humans than it does in animals due to differences in size, body composition and normal body temperatures (Merck 245). Another factor that will affect cooling rate is the density of the fur. The fur that covers the entire body of most animals can act as an insulator, keeping the body warm longer (Merck 245). Humans do not have fur, but they may be wearing thick clothing, which could slow the process of cooling. The density of the fur, size of the body and ambient temperature of the crime scene must all be taken into consideration when the veterinarian calculates postmortem interval from algor mortis.

Decomposition occurs due to enzyme breakdown of tissues, called autolysis, and bacterial activity, called putrefaction (Merck 246). The process of decomposition occurs similarly in both humans and animals because both species are home to a similar array of enzymes and bacteria. The processes of decomposition can be affected by ambient temperature, weather, size of the body, body composition, age and health of the subject, be it human or animal.

Decomposition of a body is accompanied by the colonization of that body by certain insects. These insects colonize a dead body at specific times in the process of decomposition, in specific patterns and they grow and develop at specific rates, depending on the climate (Merck 250). If the investigator documents entomological activity and climate conditions and properly collects samples, a forensic entomologist can estimate time of death of the victim, in both
human and animal cases. Entomological estimation of time of death is the most accurate way to determine postmortem interval if the body has been dead for longer than three days (Sinclair 73).

In most cases, postmortem interval is calculated using each of these individual techniques. These numbers are then compared to ensure the most accurate estimation of time of death. Each of these techniques will not elicit one time of death, but a range of possible lengths of postmortem interval. The overlap between ranges that occurs when the techniques are compared helps to narrow down the length of postmortem interval and approximate time of death.

**Taking the Case to Court**

If the defendant of a case pleads not-guilty to the charges brought against them, the prosecutor must prove their guilt in court (Merck 9). Since the defendant has the option of pleading guilty and waiving his or her right to trial, only a fraction of all criminal cases result in a trial (Merck 9). During trials, forensic scientists are often called upon to give testimony in the cases that they have worked (Dale 166). Due to the specialization of forensic science in human cases, multiple investigators will often be called to testify on their specific area of expertise for the case. In animal cases, the veterinarian serves as the expert witness. According to Dr. Melinda Merck, “Veterinarians, by nature of their training and practice, are qualified in numerous fields, unlike their human medical counterparts” (Merck 12). The forensic veterinarian can be called upon as an expert in many different aspects of the case, from collecting evidence to excavating a grave to performing a necropsy. In human cases, the medical examiner can only testify about what they collected from the body during the autopsy.
Since the veterinarian can be subpoenaed at any time during the trial, he or she should always be prepared to go to court (Merck 9).

Whether the witness is a forensic scientist or a veterinarian, he or she should come to court prepared. The expert should review all his or her notes and prepare any necessary or helpful visual aids to bring to court (Dale 166). All notes from the case should be brought to court so that the expert witness can look them over to verify information (Dale 169; Merck 10). The witness should answer questions from the prosecution and the defense honestly, without bias and using terminology that a layperson will understand (Dale 167; Merck 17). In animal cases, the veterinarian should explain things to the court as he or she would explain things to a client in a veterinary office (Merck 17).

A Case Study: Michael Vick

In 2007, Michael Vick was one of the NFL’s highest paid players, having recently signed a multimillion-dollar contract with the Atlanta Falcons. Then, in April of 2007, Vick’s cousin, Devon Boddie was arrested in possession of marijuana and gave his home address as Vick’s house in Surry County, Virginia. Investigator Bill Brinkman went to the house on April 25 with a search warrant looking for drugs; instead, he found what he determined to be evidence of a dog fighting operation. Brinkman and his team discovered a group of kennels in the back yard containing pit bulls. Many of the dogs had scars on their snouts or chests, giving Brinkman probable cause to return with another warrant to investigate a possible dog fighting ring.

Dog fighting is a felony in all 50 states. The sport was brought to America from Europe in the mid-1800s and commonly features pit bull terriers as the breed of choice for fighters.

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12 Unless otherwise stated, all information comes from “The Michael Vick Case”.

~ 23 ~
Operations can range from amateur, or ‘street’, to professional and there is an online community that promotes dog fighting. Michael Vick was most likely introduced to the sport during his adolescence in Newport News, Virginia where dog fighting is a prominent street activity.

During the raid on Vick’s home, 66 dogs were removed from the property, 53 of which were pit bulls. Many of the dogs that were removed showed evidence of being underfed and abandoned in the yard, most likely because they had lost fights or were not aggressive enough to be fighters. Brinkman and his team also found materials used during the training of fighting dogs. Two days after the raid, Michael Vick admitted to owning the property, but stated that he never visited. Neighbors, however, stated that they had seen Vick on the property often.

Investigator Bill Brinkman received information that there were multiple grave sites on the property, so he organized another search of the grounds. Shortly before the search was about to begin, the Surry County prosecutor halted the investigation. Investigator Brinkman decided to ask for federal help and on June 7, 2007 agents from the United States Department of Agriculture organized a search of the grounds. Dr. Melinda Merck of the ASPCA was the lead veterinary forensics investigator on site as the team excavated two graves containing the bodies of 8 dogs. When Dr. Merck performed necropsies on the dogs, she found evidence that the dogs had been hung and slammed to the ground.

On July 17, Vick was indicted, along with Tony Taylor, Quanis Phillips and Purnell Peace. Vick was indicted for participating in the dog fighting business called ‘Bad Newz Kennels,’ travelling to dog fights and sponsoring fights on his property. He was also accused of destroying dogs by slamming them to the ground, shooting them, electrocuting them and
drowning them. The arraignment took place on July 26.

By mid-August, Vick’s co-defendants had all pled guilty and detailed Vick’s involvement in the dog fighting operation. Michael Vick pled guilty on August 23 and held a press conference shortly afterward to apologize for his actions. On December 10, 2007, Vick was sentenced to 23 months in prison and ordered to pay almost one million dollars for the care of the dogs seized from his property. In November of 2008, while serving his sentence on the federal charges, Vick pled guilty to one state charge and not-guilty to another state charge, which was eventually dropped. Vick was given a three-year suspended sentence for his crimes.

The dogs seized from Bad Newz Kennels were surprisingly non-aggressive for the most part. Most were initially fearful of being handled, but were happy to see humans. In the end, only one dog was euthanized due to aggression. One other dog had to be put down due to health problems and the rest were spread out among sanctuaries, rehabilitation facilities and adoption programs.

Due to the hard work of Bill Brinkman, Dr. Merck and others from law enforcement and the ASPCA, Michael Vick and the others involved in Bad Newz Kennels were punished for their crimes. This is just one of a growing number of examples of the success that can come out of veterinary forensic work.

**Link to Other Violent Crimes**

Why is it important to prosecute those who abuse animals? Although justice for the animals is very important, there’s more to it than that. “Animals suffer and feel pain, and they deserve protection from abuse and neglect in their own right. Additionally, animal abuse and neglect do not occur in a vacuum but are part of a pattern of dangerous and antisocial behavior
jeopardizing people, animals and inanimate property,” (Yoffe-Sharp 733). According to Dr. Melinda Merck, “There is a proven link between animal cruelty and other acts of violence such as child abuse and domestic violence. There is a historical link of serial killers with a criminal past that involves animal abuse” (Merck xx). In 1987, animal cruelty was listed as a symptom of conduct disorder in the Diagnostic and Statistical Manual-III R. published by the American Psychiatric Association and is now used as an important indicator of one or more serious psychological problems (Tallichet 93).

The ‘graduation hypothesis’ assumes that violent individuals start out abusing animals and then modify their violent behavior until they work their way up to violence against other people (Arluke 963). In a study by Merz-Perez, Heide and Silverman, adult violent criminals were significantly more likely to have abused animals as children than adult non-violent criminals (Merz-Perez 570). A study of serial killers by Wright and Hensley found that the individuals started by venting their anger on animals as children and then graduated to violence against other humans as they aged (Wright 83). Wright and Hensley also found that, of the 354 cases of serial murder that they studied, 21 percent of the killers were known to have committed animal cruelty (Wright 76). Famous serial killers such as Jeffrey Dahmer, Ted Bundy and Henry Lee Lucas are also known to have abused animals as children and adolescents (Merck xx).

Although there is no definite way to predict future behavior, it is important to note that animal cruelty in children could be a red flag for behavior as adults. Children who abuse animals should be carefully watched for other indicators of violence as they grow. Adolescents and young adults who are violent towards animals should be prosecuted for animal cruelty.
This not only punishes them for their crimes against animals, but also hopefully prevents them from graduating to crimes against humans. With proper punishment and rehabilitation, it may be possible to prevent other crimes from occurring. If nothing else, at least the perpetrator is unable to commit other crimes while he or she is serving the time for their animal cruelty crimes.

Animal cruelty often occurs alongside domestic abuse. Pets may be abused or threatened to control a victim or to keep him or her from speaking out against the abuser or leaving (Yoffe-Sharp 733). Abusers may also give pets as gifts to apologize for the most recent incident of abuse (Yoffe-Sharp 733). In cases where animal cruelty is occurring at the same time as child or domestic abuse, it may be possible to prosecute the individual for the animal cruelty crimes when the children and/or the spouse are unwilling or unable to speak up about the violence towards them. In this way, it is possible to remove the violent criminal from the domestic violence situation without relying on the victims to speak out against him or her. In fact, cases where domestic violence and animal cruelty occur side-by-side are happening often enough that animals are now being included in Temporary Protective Orders in some areas (Merck 7).

In order to prevent animal abuse, there must be a large group of people who are willing to fight out against it. While not all people may sympathize with animals, most will empathize with other humans. If those who wish to protect animals cannot get support from those who are not animal lovers, it may be possible to appeal to their human nature by telling them about the other crimes that may be prevented or the people who could be taken out of the danger of domestic abuse. Pointing out how prosecuting animal abusers will benefit human kind may win
over those who think, ‘Why does it matter? They’re just animals.’ This may help win animal abuse cases by enlisting the support of more than just a small group of animal lovers.

**Conclusion**

The future of veterinary forensics is very promising. The ASPCA has recently broken ground on its Anti-Cruelty Institute in New York, scheduled to open in 2010. The building will serve as place to educate veterinarians and others and will also be home to a forensic laboratory, veterinary hospital and treatment center for victims of animal cruelty (Veterinary Medicine 74).

In order to prepare students for work in the field of veterinary forensics, the ASPCA and the University of Florida have announced their plans to develop the ASPCA Veterinary Forensic Sciences Program, offering undergraduate, graduate and continuing education courses (ASPCA, “Press Release”). The William R. Maples Center for Forensic Science has already worked with the ASPCA to operate three seminars in veterinary forensics and they have two more scheduled for summer and fall of 2009.

In April 2009, the International Veterinary Forensic Sciences Association will begin its charter year. The organization aims to “educate and promote the application of modern forensic science techniques to legal investigations involving animal cruelty, abuse, and death” (IVFSA).

These accomplishments are acting to put the field of veterinary forensics on the map, increase the public’s knowledge about the field and educate veterinary and forensic professionals alike about the necessary actions that must be taken at an animal cruelty crime scene. Hopefully, with increased education, more animal cruelty cases will be reported and will
be handled correctly. As the laws against animal cruelty strengthen and as the public becomes less tolerant of animal cruelty, the number of successful animal cruelty prosecutions will increase. Veterinary forensics will play a huge role in the success of these cases by providing the evidence necessary to convince a jury to convict those who abuse animals.
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Lastly, but certainly not least, I would like to thank my mother, without whom I would not have discovered the field of veterinary forensics. Her annual subscription to People Magazine actually paid off! Thanks also for all the wonderful support that she and the rest of my family have always provided, both emotional as well as monetary. I greatly appreciated all the help I received paying for the trips to Florida for the seminars.
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Appendix

Appendix A: Request for Crime Scene Assistance

Animal Crime Scenes Clandestine Gravesites

REQUEST FOR CRIME SCENE ASSISTANCE

<table>
<thead>
<tr>
<th>AGENCY:</th>
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TIMES

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SCENE NARRATIVE

PERSONNEL ON ARRIVAL:

LOCATION & DESCRIPTION OF SCENE:

ASSISTANCE RENDERED:

VICTIM(S): ___________________________ SUBJECT(S): ___________________________

CASE SUMMARY:

~ 34 ~
### Appendix B: Crime Scene Log

#### Animal Crime Scenes

**Crime Scene Log**

<table>
<thead>
<tr>
<th>Type of Radio Call (Exactly as Broadcast, Unit No, Type, Location, Etc.)</th>
<th>Case Number</th>
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<tbody>
<tr>
<td>Date &amp; Time Received Call:</td>
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<tr>
<td>First Unit On Scene:</td>
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</tr>
<tr>
<td>First Supervisor at Scene:</td>
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</tr>
<tr>
<td>Type: (Murder, Robbery, ETC.)</td>
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<tr>
<td>Unl1 Handler:</td>
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<tr>
<td>Crime Scene Log Originator (Name, Badge #, Unit #):</td>
<td></td>
</tr>
<tr>
<td>Victim:</td>
<td></td>
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</table>

**ALL PERSONNEL AT SCENE** (Include above personnel and all persons entering or assigned to crime scene)

<table>
<thead>
<tr>
<th>Time Arrived</th>
<th>Depart Time</th>
<th>Unit Number</th>
<th>Division/Agency</th>
<th>Name</th>
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</tbody>
</table>
Appendix C: Sketching the Crime Scene (1)
Sketching

Measurements of Items contained within the grid

<table>
<thead>
<tr>
<th>Items</th>
<th>from North wall</th>
<th>from West wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>2</td>
<td>47&quot;</td>
<td>42&quot;</td>
</tr>
</tbody>
</table>

10' x 10' grid
Sketching

Measurements outside of Grid with Baseline

Reference point

10' x 10' grid

Baseline

Items of Evidence outside grid

1

2
Sketching

Measurements outside of Grid with Triangulation

Reference point

10' x 10' grid

1

Items of Evidence outside grid

2
Appendix G: Forensic Entomology Animal Data Form

FORENSIC ENTOMOLOGY ANIMAL DATA FORM

<table>
<thead>
<tr>
<th>DATE:</th>
<th>CASE NUMBER:</th>
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<tbody>
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<td>COUNTY/STATE</td>
<td>AGENCY:</td>
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<tr>
<td>DECEDENT</td>
<td>AGE:</td>
</tr>
<tr>
<td>SEX:</td>
<td></td>
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</tbody>
</table>

Last Seen Alive:  Date and Time Found:  
Date Reported Missing:  Time Removed from Scene:  

Site Description:  

Death Scene Area:

<table>
<thead>
<tr>
<th>Rural:</th>
<th>Urban/suburban:</th>
<th>Aquatic habitat:</th>
<th>Exposure:</th>
<th>Stage of decomposition:</th>
<th>Evidence of scavengers:</th>
</tr>
</thead>
<tbody>
<tr>
<td>forest</td>
<td>closed building</td>
<td>pond</td>
<td>Open air</td>
<td>fresh</td>
<td></td>
</tr>
<tr>
<td>field</td>
<td>open building</td>
<td>lake</td>
<td>burial/depth</td>
<td>bloat</td>
<td></td>
</tr>
<tr>
<td>pasture</td>
<td>vacant lot</td>
<td>creek</td>
<td>type of debris on body</td>
<td>active decay</td>
<td></td>
</tr>
<tr>
<td>brush</td>
<td>pavement</td>
<td>small river</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>roadside</td>
<td>closed building</td>
<td>irrigation canal</td>
<td></td>
<td>advanced decay</td>
<td></td>
</tr>
<tr>
<td>barren area</td>
<td>open building</td>
<td>ditch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>closed building</td>
<td>pavement</td>
<td>swampy area</td>
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<td>mummification</td>
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<tr>
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<td>vacat lot</td>
<td>large river</td>
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<td>skeletonization</td>
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<td>closed building</td>
<td>small river</td>
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<td>saponification</td>
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</tr>
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<td>Urban/suburban:</td>
<td>Aquatic habitat:</td>
<td>Exposure:</td>
<td>Stage of decomposition:</td>
<td>Evidence of scavengers:</td>
</tr>
<tr>
<td>barren area</td>
<td>closed building</td>
<td>pond</td>
<td>Open air</td>
<td>fresh</td>
<td></td>
</tr>
<tr>
<td>closed building</td>
<td>open building</td>
<td>lake</td>
<td>burial/depth</td>
<td>bloat</td>
<td></td>
</tr>
</tbody>
</table>

Scene temperatures:  

<table>
<thead>
<tr>
<th>Scene temperatures:</th>
<th>Number of preserved samples</th>
<th>Number of live samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>ambient:</td>
<td></td>
<td></td>
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<tr>
<td>ambient (1ft):</td>
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<tr>
<td>body surface:</td>
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<tr>
<td>ground surface:</td>
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<tr>
<td>under-body interface</td>
<td></td>
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<tr>
<td>maggot mass:</td>
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<tr>
<td>water temp, if aquatic</td>
<td></td>
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<tr>
<td>enclosed structure:</td>
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<tr>
<td>AC/Heat:</td>
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<td></td>
</tr>
<tr>
<td>on/off</td>
<td></td>
<td></td>
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<tr>
<td>ceiling fan:</td>
<td></td>
<td></td>
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<tr>
<td>on/off</td>
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<tr>
<td>soil temperature:</td>
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<tr>
<td>1in</td>
<td></td>
<td></td>
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<tr>
<td>2in</td>
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</tbody>
</table>

NOTE: Record all temperatures periodically each day at the site for 3-5 days after body recovery.

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Appendix H: Items Collected Worksheet

Animal Crime Scenes

ITEMS COLLECTED WORKSHEET

<table>
<thead>
<tr>
<th>ITEM #</th>
<th>DESCRIPTIONS</th>
<th>ANALYSIS</th>
</tr>
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</tbody>
</table>

AGENCY CASE #: ____________________
Appendix I: Evidence Receipt Form

ANIMAL CRIME SCENES ~ CLANDESTINE GRAVESITES
Evidence Receipt Form

Agency: ___________________________ Agency Case #: ___________________________

I hereby acknowledge receipt of the following described item(s) which was/were given into my custody by the indicated releasing individual:

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

From: ___________________________ Signature: ___________________________ Date/Time: __________

(print name)

To: ___________________________ Signature: ___________________________ Date/Time: __________

(print name)

From: ___________________________ Signature: ___________________________ Date/Time: __________

(print name)

To: ___________________________ Signature: ___________________________ Date/Time: __________

(print name)

From: ___________________________ Signature: ___________________________ Date/Time: __________

(print name)

To: ___________________________ Signature: ___________________________ Date/Time: __________

(print name)
Figure 5.6: Lateral view of the skeleton of the cat. (From S.E. Moore. "A Study of the Cat")
Appendix K: Bone List

Cat/Dog Skeleton List

Case: ____________________________ Animal ID: ____________________________

Skull ___ (Dentition: Dog I 1-3, C 1, P 1-4, M 1-2; Cat I 1-3, C 1, P 2-4, M 1)
Mandible ___ (Dentition: Dog I 1-3, C 1, P 1-4, M 1-3; Cat I 1-3, C 1, P 3-4, M 1)

Notes:

Hyoid ___
Notes:

Clavicle ___
Notes:

Cervical Vertebra (7) ___
Notes:

Thoracic Vertebra (13) ___
Notes:

Lumbar Vertebra (7) ___
Notes:

Sacrum ___
Notes:

Coccygeal Vertebra ___
Notes:

Pelvis ___
Notes:

Ribs (13) ___ Costal Cartilage (13) ___
Notes:

Sternum ___
Notes:

Scapula ___
Notes:

Humerus ___
Notes:

Ulna ___
Notes:
Case: ________________ Animal ID: ________________

Radius
Notes:

Carpals
Notes:

Metacarpals
Notes:

Phalanges (Front)
Notes:

Sesamoids
Notes:

Femur
Notes:

Patella
Notes:

Tibia
Notes:

Fibula
Notes:

Tarsals
Notes:

Metatarsals
Notes:

Phalanges (Hind)
Notes:

Sesamoids
Notes:

Additional Bones:

?
Appendix L: Body Condition Assessment

Body Condition Assessment

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Emaciated</td>
</tr>
<tr>
<td></td>
<td>No palpable fat</td>
</tr>
<tr>
<td></td>
<td>Obvious loss of muscle mass</td>
</tr>
<tr>
<td></td>
<td>All bony prominences evident from a distance</td>
</tr>
<tr>
<td></td>
<td>Severe abdominal tuck and extreme hourglass shape</td>
</tr>
<tr>
<td>4</td>
<td>Very Underweight</td>
</tr>
<tr>
<td></td>
<td>No palpable fat</td>
</tr>
<tr>
<td></td>
<td>Some loss of muscle mass</td>
</tr>
<tr>
<td></td>
<td>Ribs, lumbar vertebrae and pelvic bones easily visible</td>
</tr>
<tr>
<td></td>
<td>Prominent abdominal tuck. Hourglass shape to torso</td>
</tr>
<tr>
<td>3</td>
<td>Thin</td>
</tr>
<tr>
<td></td>
<td>No palpable fat</td>
</tr>
<tr>
<td></td>
<td>Minimal loss of muscle mass</td>
</tr>
<tr>
<td></td>
<td>Ribs easily palpated (may be visible). Tops of lumbar vertebrae visible. Pelvic bones becoming prominent</td>
</tr>
<tr>
<td></td>
<td>Obvious waist and abdominal tuck</td>
</tr>
<tr>
<td>2</td>
<td>Underweight/Lean</td>
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<tr>
<td></td>
<td>Waist visible from above. Abdominal tuck evident</td>
</tr>
<tr>
<td></td>
<td>Ribs easily palpable with minimal subcutaneous fat</td>
</tr>
<tr>
<td></td>
<td>No muscle loss</td>
</tr>
<tr>
<td></td>
<td>May be normal for lean breeds such as sighthounds</td>
</tr>
<tr>
<td>1</td>
<td>Ideal</td>
</tr>
<tr>
<td></td>
<td>Abdomen tucked slightly when viewed from the side</td>
</tr>
<tr>
<td></td>
<td>Waist visible from above, just behind the ribs</td>
</tr>
<tr>
<td></td>
<td>Ribs palpable without excess subcutaneous fat</td>
</tr>
</tbody>
</table>
# Appendix M: Skin Condition Assessment

## Skin Condition: Cat

<table>
<thead>
<tr>
<th>Condition of Skin: Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Show location, size, and distribution of skin wounds or lesions (Describe on diagram or in Comments section)</td>
</tr>
<tr>
<td>2) External parasites Yes No (Describe in comments section or next to diagram include estimate of numbers)</td>
</tr>
</tbody>
</table>

**COMMENTS**

<table>
<thead>
<tr>
<th>separate page for description of hair and nails</th>
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<tbody>
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Skin Condition: Dog

1) Show location, size, and distribution of skin wounds or lesions (Describe on diagram or in Comments section)
2) External parasites Yes No (Describe in comments section or next to diagram. Include estimate of numbers)
**Appendix N: Condition of Haircoat and Nails**

**Condition of Haircoat and Nails: Cat**

<table>
<thead>
<tr>
<th>Physical care scale (see definitions next page)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Adequate</td>
</tr>
</tbody>
</table>

After Dr. G. Patronek, Tuft Care and Condition Scoring Scales, American Humane Association, 1998

**COMMENTS**
# Condition of Haircoat and Nails: Dog

<table>
<thead>
<tr>
<th>Condition of Haircoat and Nails: Dog</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical care scale</strong> (see definitions next page)</td>
</tr>
<tr>
<td>1) Adequate</td>
</tr>
</tbody>
</table>


### Comments

<p>| | | | | |</p>
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~ 50 ~
## Appendix O: Weight Change Worksheet

### Weight Change

<table>
<thead>
<tr>
<th>Date</th>
<th>Weight (#)</th>
</tr>
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<tbody>
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</tbody>
</table>

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### Necropsy History

**Necropsy of Neglect/Abuse Case**

<table>
<thead>
<tr>
<th>History</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of necropsy</td>
<td>AM PM</td>
<td>/ /</td>
</tr>
<tr>
<td>Time dog last seen alive</td>
<td>AM PM</td>
<td>/ /</td>
</tr>
<tr>
<td>Time animal found dead</td>
<td>AM PM</td>
<td>/ /</td>
</tr>
</tbody>
</table>

*Describe circumstances of death below*

---

**Preliminary conclusion**

*Physical Findings on following pages*

---

**Histopathology pending?** Y N

**Toxicology pending?** Y N

---

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Appendix Q: Necropsy Worksheet

Necropsy Worksheet

Gross Examination Worksheet - Necropsy

PROSECTOR: Date: Time: a.m. p.m.

GENERAL CONDITION: (Nutritional condition, physical condition)
Neonates: examine for malformations (cleft palate, deformed limbs etc)
Weight: ____________ #

Body condition
Ideal (1) Underweight/Lean (2) Thin (3) Underweight (4) Emaciated (5)

SKIN: (haircoat, skin, pinna, feet, subcutaneous fat and subcutaneous bruising)
Attach separate sheet for wound/injury and distribution Yes No

MUSCULOSKELETAL SYSTEM: (Bones, joints, and muscles)
Radiographs: Yes (see separate form) No

BODY CAVITIES: (Fat stores, abnormal fluids)
Neonates: assess hydration (tissue moistness)
Necropsy Worksheet (continued)

HEMOLYMPHATIC: (Spleen, lymph nodes, thymus)

RESPIRATORY SYSTEM: (Nasal cavity, larynx, trachea, lungs, and regional lymph nodes)
Neonates: Did breathing occur (i.e., do the lungs float in formalin)? Yes No

CARDIOVASCULAR SYSTEM: (Heart, pericardium, and great vessels)

DIGESTIVE SYSTEM: (Mouth, teeth, esophagus, stomach, intestines, liver, pancreas, mesenteric lymph nodes).
Diarrhea
Intestinal parasites

Feces submitted for ova and parasites? Yes
Neonates: is milk present in stomach? Yes No

URINARY SYSTEM: (Kidneys, ureters, urinary bladder, and urethra)
## Appendix R: External Wounds

### External Wounds: Cat

<table>
<thead>
<tr>
<th>Necropsy: External Wounds/Lesions: Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Show location, size, and distribution of skin wounds or lesions (Describe on diagram or in Comments section)</td>
</tr>
<tr>
<td>2) External parasites: Yes No (Describe in comments section or next to diagram. Include estimate or numbers)</td>
</tr>
</tbody>
</table>

![Diagram of a cat showing different views with wounds marked]

### Comments

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<tr>
<th>COMMENTS</th>
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External Wounds: Dog

Necropsy: External Wounds/Lesions: Dog

1) Show location, size, and distribution of skin wounds or lesions (Describe on diagram or in Comments section)
2) External parasites Yes No (Describe in comments section or next to diagram. Include estimate of numbers)

COMMENTS separate page for description of hair and nails

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Exam/Necropsy Report

Agency:
Officer:
Case:

Examining Veterinarian:

Date of Exam:

EXAM/NECROPSY REPORT

SUBJECT OF EXAM:

REASON FOR EXAM:

CRIME SCENE/FORENSIC FINDINGS:

MEDICAL HISTORY:

EXAMINATION FINDINGS:
External Exam:
Weight:
Coat Condition:
Body Condition Score:
Decomposition:
Ectoparasites:
Head:
Chest:
Abdomen:
Legs:
Feet:

Evidence of Medical/Surgical Intervention:
Exam/Necropsy Report (continued)

Radiographic Interpretation:

Internal Exam:
  Head:
  Thoracic Cavity:
  Abdominal Cavity:
  Neck:
  Respiratory Tract:
  Cardiovascular System:
  Gastrointestinal Tract:
  Biliary Tract:
  Pancreas:
  Spleen:
  Adrenals:
  Urinary Tract:
  Reproductive Tract:
  Musculoskeletal System:

Evidence of Injury:

PROCEDURES AND RESULTS:

ENTOMOLOGY FINDINGS:

SUMMARY OF FINDINGS:

SURVIVAL PERIOD:

TIME OF DEATH:

MECHANISM OF DEATH:

CAUSE OF DEATH:

CONTRIBUTORY CAUSE:

MANNER OF DEATH:

CONCLUSIONS:
# Appendix T: Preliminary Veterinary Statement

**Preliminary Veterinarian Statement**

<table>
<thead>
<tr>
<th>On</th>
<th>I evaluated a (age, breed, species)</th>
<th>I found the (species) to be (general appearance, temperament etc.)</th>
</tr>
</thead>
</table>

**List specific findings below**

| Attach external wound form | Y | NA |
| Radiology | Y | NA |
| Histopathology | Y | NA |

**Body condition at presentation:**
1. Ideal  
2. Underweight/Lean  
3. Thin  
4. Very Underweight  
5. Emaciated

**Description of body condition on next page**

---

**Pending**

| Histopathology | Y | N |
| Radiographs | Y | N |
| Toxicology | Y | N |

**Preliminary Conclusion**

---

The above statement is an accurate summary of my findings.

[Signature]

[Stamp of veterinarian]

[Signature of veterinarian]

[Date]

---

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Appendix U: Final Veterinary Statement

Final Veterinarian Statement

Final Veterinarian Statement - NECROPSY

On __/__/I performed a post-mortem evaluation on a ____________________________ (age, breed, species).
I found the ____________________________ (species) to be ____________________________ (general appearance).

List specific findings below

Attach External wound form Y NA Internal wound form Y NA Histopathology results Y NA
Attach Radiology interpretation Y NA Radiology consult Y NA Toxicology results Y NA

Body condition at presentation: Ideal (1) Underweight/Lean (2) Thin (3) Very Underweight (4) Emaciated (5)
Description of body condition on next page

Weight at Presentation #

Conclusion

The above statement is an accurate summary of my findings

Stamp of veterinarian
Signature of veterinarian
Date

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Appendix V: Fixed Histology Checklist

Fixed Tissue Histology Checklist

Preserve the following tissues in 10% buffered formalin at a ratio of 1 part tissue to 10 parts formalin. Tissues should be no thicker than 1 cm. INCLUDE SECTIONS OF ALL LESIONS AND SAMPLES OF ALL TISSUES ON THE TISSUE LIST.

- Salivary gland
- Oral/pharyngeal mucosa and tonsil: plus any areas with erosions, ulcerations, or other lesions
- Tongue: cross section near tip, including both mucosal surfaces
- Lung: sections from several lobes, including a major bronchus
- Trachea
- Thyroid/parathyroids
- Thymus
- Heart: sections from both sides, including valves
- Liver: sections from three different areas, including gall bladder
- Spleen: cross sections, including capsule
- Gastrointestinal tract: 3-cm-long sections of:
  - Esophagus
  - Stomach: multiple sections from all regions of the lining
  - Intestines: multiple sections from different areas
- Omentum: ~3-cm square
- Pancreas: sections from two areas
- Adrenal: entire gland with transverse incision
- Kidney: cortex and medulla from each kidney
- Urinary bladder, ureters, urethra: cross section of bladder and 2-cm sections of ureter and urethra
- Reproductive tract: entire uterus and ovaries with longitudinal cuts into lumens of uterine horns. Both testes (transversely cut) with epididymis. Entire prostate, transversely cut.
- Eye
- Brain: cut longitudinally along midline
- Spinal cord: (if neurological disease) sections from cervical, thoracic, and lumbar cord
- Diaphragm and skeletal muscle: cross section of thigh muscles
- Opened rib or longitudinally sectioned femur: marrow must be exposed for proper fixation
- Skin: full thickness of abdominal skin, lip, and ear pinna
- Neonates: umbilical stump, including surrounding tissues

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