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A frightful--but not necessarily fatal--madness:
Rabies in eighteenth-century England and English North America

by

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CHAPTER 1: INTRODUCTION

For John Neale it all started in 1741 the Thursday before Michaelmass.¹ Neale, who was a London dogleech², was called upon to treat a sick dog. Unfortunately in the process of giving the animal some medicine Neale was bitten on the thumb.³ The next day the animal in question refused all food and became very lethargic ; it eventually died that night. The dog's death was attributed to an affliction that caused both alarm and horror in the eighteenth-century world--hydrophobia or rabies.⁴

Neale was sufficiently alarmed by the circumstances surrounding the dog's sickness and eventual death to proceed directly to St. George's Hospital for medical assistance.⁵ There his wound was bled and cauterized and he was directed to take a cold bath and to use a medicine known as Pulvis Antilyssus. For the next two weeks Neale experienced little or no problem with his health. Then during the full of the moon Neale began to experience a numbness in the bite wound which quickly spread throughout his hand and arm. His condition very quickly began to deteriorate. He began to exhibit psychological dysfunction, characterized in part by an absolute terror of dogs. He was also deeply concerned he might go mad, so much so that he had himself tied to his bed in order to protect the other patients.

¹ Michaelmass, or the feast of St. Michael, is held on September 29.

² An eighteenth century version of a veterinary practitioner who specializes in dogs as patients.

³ This particular case was documented in 1744 in the Philosophical Transactions of the Royal Society. See: Charles Peters, M. D., "The Case of A Person Bit by A Mad Dog," Philosophical Transactions of The Royal Society 43 (1744): 257-62.

⁴ Classical authors, such as Galen, recognized rabies and hydrophobia to be generally the same. Rabies was the name given the form of disease that attacked the dog while hydrophobia was the name for the affliction in humans. Since most eighteenth-century authors followed the classical pattern and because most medical literature involved humans hydrophobia was the term most commonly seen. Throughout this work I will use these terms interchangeably, since they are simply terms for the same disease.

⁵ In 1741 St. George's Hospital, which bordered on Hyde Park, was considered one of the best of the London Charity Hospitals. There is a certain irony, then, that the building built in the 1720s to treat the ailing London poor is today a high class London Hotel, charging better than £ 100 a night for a room.

Neale also complained of excruciating headaches and a difficulty in swallowing. In time this last symptom took precedent over the others. In fact so serious was this problem that simply swallowing a piece of bread or a small amount of ale caused Neale to be seized with violent abdominal spasms and a feeling of strangulation. Interestingly, despite these severe reactions Neale's ability to take nourishment remained generally unimpaired.

The attending physicians, Doctors Hoadly, Baily and Peters, quickly concluded this condition was the result of an inflammatory fever and treated it accordingly. For the next two weeks Neale was subjected to the full regimen of eighteenth-century medical therapeutics. This included not only medicines that were considered efficacious against the specific ailment of hydrophobia but also treatments used to counteract general inflammatory conditions. Neale was copiously bled--once nearly sixteen ounces was removed at one time--and received numerous enemas, blisters and cooling laxatives. He also received boluses--large pills--of Nitre Mithridate and Thebiac.

These treatments seemed to be effective for at the end of the two weeks Neale's condition had so improved that his treatment now consisted simply of cold baths. In time Neale was restored to near normal health--he still had some minor symptoms during periods of new and full moons--and he was able to return to work. This experience, though, left him with such a dread of dogs that he gave up his practice and became a green grocer instead.⁶

The case of John Neale is a reflection of many, if not most, of the problems, concerns, and general pratfalls that were seen with rabies in the eighteenth century English-speaking world. As a rule rabies is not that serious a disease, epidemiologically. It mainly affects wildlife and companion animals, creatures whose economic value is minimal. While the disease can be spread to humans, the means of contagion, through infected body fluids, establishes that the incidence of infection is generally low.⁷ Despite this rabies is still considered one of the most frightful of the afflictions that attack humans and animals. This heightened concern, exceeding any true public health threat, is due to a number of factors that have been present also since rabies first made its appearance as an affliction.

Historical studies of rabies have as of late been less than satisfactory. The first comprehensive examination was written in 1872 by a British veterinarian named George Fleming. His work, Rabies and Hydrophobia, attempted to examine the

⁶ Peters, 262.

⁷ Harriet Ritvo, The Animal Estate (Cambridge, Massachusetts: Harvard University Press, 1987) 167.

disease from every aspect, including an historical one. For all the effort by Fleming, his historical examination left a great deal to be desired. It is little more than an historical laundry list of rabies outbreaks, with little or no analysis of the surrounding circumstances. He also failed to examine the social, economic and medical beliefs and attitudes towards this disease. Many of the so-called outbreaks were occurrences of other diseases. His suggestion, in both this work and his work Animal Plagues, that a series of disease outbreaks in colonial New England in 1768 was rabies is without foundation ; the disease was probably equine influenza, a disease well documented in both England and New England in the 1760s.⁸ Fleming also attributed a large number of deaths of cattle, swine and dogs in New England in 1770-71 to rabies--a recent reevaluation has shown that it was probably pseudorabies, a herpes viral infection prevalent in swine, cattle and other livestock.⁹ Fleming also suggested that a disease among sled dogs in the nineteenth century was rabies--a recent reexamination indicates that it may have been a form of encephalitis.¹⁰

One of the better works on the history of rabies is by Jean Theodorides. Entitled Histoire De La Rage Cave Canem , 1986, this work provides one of the best discussions of Pasteur's work with this disease. His work is not without its errors--in particular his examination of rabies in the ancient and classical world is less than accurate ; still, it is the best examination of the history of this disease now available.¹¹

The beliefs about, and approaches to rabies in the eighteenth century were subject to three factors : the inability to accurately diagnose the disease, the horrific symptoms often seen, symptoms which often led to more than a little hysteria during rabies outbreaks, and, more importantly from a point of view of control, that the main victim of this disease-- the dog--was of all the domestic animals the one who enjoyed the closest relationship with humans.

In the eighteenth century no other disease that affected both humans and animals received so much attention and concern. Rabies was one of the most discussed, most written

⁸ George Fleming, Rabies and Hydrophobia (London: Chapman and Hall, 1872), 31; George Fleming, Animal Plagues (London: Chapman and Hall, 1871), 429 ; Charles Creighton, A History of Epidemics in Britain (Cambridge: Cambridge University Press, 1891-4), vol. 2, 355.

⁹ Fleming, 1872, 31.

¹⁰ Fleming, 1872, 81-83.

¹¹ Jean Theodorides, Histoire De La Rage Cave Canem (Paris: Masson, 1986) .

about diseases in this period. For all the press the disease caused relatively few deaths. In an average year more people died in London of alcohol poisoning than rabies. The main problem with rabies was that exact diagnosis was almost impossible. The diagnosis of rabies in the eighteenth century was grounded on two theories: all dogs that bit were rabid and anyone bit by a rabid dog--i.e. a dog that bit--would eventually come down with rabies, even if it took years. The fact that cats, unlike dogs, defend themselves with their claws and not their teeth would suggest this animal would not be subjected to same heightened concerns. The problem was that final determination of rabies was based almost entirely on the symptoms, a process that many times was both ambiguous and very subjective. In both humans and animals many diseases could, and often did, produce symptoms that mistaken for the symptoms of rabies. In animals everything from equine influenza to pseudorabies to territorial disputes between male dogs were mistaken for rabies. Relatively speaking, the accurate determination of rabies was to wait until the individual in question died. (The problem with this was that humans and animals often died of afflictions whose symptoms closely resembled rabies--in humans strokes and tetanus were often mistaken for this disease¹²--thus making even this means of diagnosis questionable at best.)

It was the problem of diagnosis which helped stimulate some of the earliest scientific investigations of this disease. As eighteenth-century medical scientists moved away from theories that saw disease as a result of general bodily dysfunction and towards beliefs in disease as a breakdown or failure of an organ, or combination of organs, attempts were made to correlate the symptoms of rabies with pathoanatomical changes seen in their victims. The results of these new investigations were mixed at best. The pathological signs seen with this disease were less than dramatic--slight inflammation of the respiratory and upper gastrointestinal tract. In fact, the only real positive results to arise from these anatomical investigations was the debunking of the theory that humans with rabies barked like dogs. It was originally believed humans with rabies would eventually bark, growl and even walk on all fours like dogs. The pathoanatomical evidence indicated that this so-called 'barking' was in fact a hoarseness brought on by the inflammation of the upper respiratory tract.

If the autopsies of the victims were less than definitive as far as the diagnosis of rabies went, another method of investigation proved even less successful--the attempt to artificially

¹² For an example of the misdiagnosis of rabies in such a situation see: Pinehenier, M.D., "A Case of Spontaneous Hydrophobia Followed by Madness," Gentlemen Magazine 29 (1759): 401-403.

produce this disease in an experimental animal via inoculation. For the first time scientists and medical men attempted to produce artificially induce rabies in experimental animals. These early experiments were generally unsuccessful, so much so that they may have led a number of prominent scientists to conclude that since rabies cannot be artificially produced in the dog it must arise spontaneously.

The problem of diagnosis was further complicated by a condition in humans known as 'hysterical rabies.' It was not uncommon for humans bitten, scratched or licked by suspected animals to acquire all the symptoms of rabies. Often these symptoms almost immediately after the exposure to the animal in question. A few did not even wait for the human-animal contact but developed the disease spontaneously.¹³ (By the late nineteenth century the condition became so common that it was recognized as a clinical entity ; one particular case was brought about from reading New York newspapers.)¹⁴ Hysterical rabies led to an immense overdiagnosis of this disease in humans, so much so, that at times rabies appeared to have epidemic proportions. Even today rabies is subject to a certain degree of hysteria, often fueled by sensational news stories. Stories such as "A tide of Anxiety over Rabies Sweeps The New York Region-Hitchhiking Raccoons May Spread a Disease to Urban Areas",¹⁵ "Woman Bitten by Rabid Raccoon The Climbed Down A Chimney"¹⁶ , or the classic " Rabid Fox Found 10 Miles from Channel"¹⁷ hardly help to allay the present concerns about this disease. Such sensationalism is not simply a modern phenomenon. In the eighteenth century rabies was blamed for at least one grisly homicide---one individual who supposedly was bitten by a dog a few days before his wedding came down with rabies on his wedding night, during which he killed and partially ate his bride.¹⁸

The hysteria had one positive aspect in that it helped establish rabies as a disease which responded to treatment. As late as 1800 some medical and veterinary practitioners did not

¹³ See footnote # 7

¹⁴ Anony., "A Case of Imaginary Hydrophobia," Medical Record 30 (1886) 404 ; John Blaisdell, "Louis Pasteur, Alexandre Liataud, and The Riverdale Dog Case," Veterinary Heritage 15 (1992): 2-16.

¹⁵ New York Times (New York City) 6 May 1991.

¹⁶ New York Times (New York City) 21 June 1991.

¹⁷ London Times (London) 7 March 1990.

¹⁸ Anonymous, "Historical Chronicle," Gentlemen Magazine 36 (1766) 100.

believe rabies was always fatal.¹⁹ For the first half of the eighteenth century numerous treatments abounded that were touted as effective against this affliction. As the century progressed improvements in diagnosis caused most of these medicines to be seen as little more than placebos for hysterical rabies. The medical profession eventually determined that once the actual symptoms appeared there was no effective treatment for this disease. This realization led to a new approach as far as therapeutics went. by the 1770s and 80s the aggressive treatment of the bite wound was seen by most established medical practitioners as the only effective therapy.

The hysteria that accompanied rabies or hydrophobia not only affected the way the disease was treated but also the means used to prevent it. Here, though, any attempts at rabies prevention ran up against a long established, highly emotional social phenomenon-the relationship of humans and dogs. One prominent anthropologist has noted that dogs and cats are the only domesticated animals that are allowed to exist in an intimate relationship with humans.²⁰ This is especially true today. Dogs and cats have become surrogate children for unmarried couples, couples without children or couples whose children have grown and moved away. (What is the difference between a dog and a child? You don't have pay for a dog's college education!) For other humans the emotional support system dogs and cats provide is a powerful therapy against loneliness, social alienation and depression. Clearly, these animals are much more than needless extravagances.

It could be argued this social phenomenon of human-companion animal relationship is a relatively modern occurrence, brought on by the increasingly complex, increasingly hectic society of the twentieth century. The problem with this is that, until recently, there appeared no evidence to either confirm or refute this theory. If there is one thing modern historians agree upon it is that the history of companion animals has been sadly neglected. One scholar noted:

The history of pets has not received the historical attention it deserves. Almost everything remains to be done concerning the advent of pet keeping among major social groups and the popularity of various types of pets over time. Yet the importance of the

¹⁹ For a condensed discussion of this attitude see: John Blaisdell, "Situation Frightful but Not Necessarily Fatal: Rabies in Eighteenth-Century England," Veterinary History 6 (1990/91): 125-134.

²⁰ Desmond Morris, Dogwatching (New York: Crown Publishers, 1987), 4-5 .

subject is undeniable. Pets have come to serve as a vital focus of modern society and historians should investigate how this came about and what it has meant.²¹

A second author observed : "The history of animals has largely been confined to agriculture : no serious historian I know has paid any attention to pets" .²²

Such an examination is vital to the historical study of rabies because the main control of this disease in then eighteenth century involved control of the dog population. It could be easily argued that because humans in the eighteenth century were considered far more important than dogs there would have been little or no resistance to widespread indiscriminate slaughter of all dogs, including those kept as 'useless pets'. The evidence, though, does not back this up. In fact the control of the dogs populations in eighteenth-century England and English North America were more often than not a reflection of the attitudes towards those animals. And in the eighteenth century these attitudes were far more complicated than originally imagined.

In England In the eighteenth century this relationship was undergoing profound changes, especially with respect to urban society. Within this aspect of the English-speaking world the status of both the dog and the cat was very much on the rise. Originally tolerated if, and only if, they worked for their keep, by the eighteenth century both dogs and cats were becoming nonworking albeit valued members of polite middle class society. This rise in an interest in domestic carnivores combined with a dramatic rise in the size of the middle class guaranteed an explosion in their populations, especially in urban areas. Combine this with the problem of overdiagnosis of rabies and one has a situation that is tailor-made for 'epidemics' of hydrophobia in England and colonial America. While these outbreaks were heaven-sent for the numerous wonder drugs for rabies they did little for the immediate status of dogs and cats.

Again and again there were demands for the destruction of all dogs, or at least all strays, as a way of controlling an outbreak of rabies. More often than not such demands run up against fierce resistance. In particular any attempts at the killing of middle class dogs could, and often did, lead to expensive lawsuits. In addition there was a new sensibility towards indiscriminate cruelty towards animals. These factors generally led to rather limited methods of control. Almost without exception the destruction orders for dogs was applied only to strays. Animals who presented evidence of ownership were generally exempted. One outcome

²¹ Charles Phineas, "Household Pets and Urban Alienation," Journal of Social History 7 (1974): 338.

²² Neil Mckendrick, John Brewer and J.H. Plumb, The Birth of A Consumer Society, (Bloomington: Indiana University Press, 1982), 317-8.

of this may have been the rise of the dogtag--it may have been created initially as proof of ownership and thus became a savior of many an eighteenth-century dog.

In New England animal control was further complicated by well-established anti-cruelty laws. It is well documented that the laws were strictly enforced. More than a few individuals were accused, tried and eventually convicted of cruelty to animals. Additionally, early New England communities established an institution that may have helped limit more than one rabies outbreak--the public animal pound. By isolating livestock and dogs from possible carriers the effects of rabies was generally limited. Occasionally, though, rabies seems to have reached epidemic proportions, especially among livestock. This suggests that possibly some other affliction with symptoms similar to rabies was present.

In time both societies recognized that animal control and isolation was not enough to prevent this disease from reoccurring. In time both localities introduced dog taxes as a means of prevention. In England the tax took on a certain class consciousness--one of the reasons given for the tax was to make the owning of dogs too expensive for the poor who, many argued, did not have the intellectual and moral abilities to care for such creatures. What little evidence is available suggests the tax in North America, while brief, functioned well. In England it became the quinessential model for that phrase: "no good deed goes unpunished". In the end it was not the poor, but the rich with their many and varied dogs, who found the tax a strenuous burden. One nobleman paid nearly £21 a year for his animals ; this at a time when a good veterinary practitioner made £30 a year.²³ Not surprisingly, this tax was quickly repealed. Nevertheless, it set the standard for future measures.

With the repeal of this tax the eighteenth-century measures against rabies came to an end. Still, a foundation had been laid that would be built upon throughout the nineteenth century. More scientific investigation, including numerous attempts at artificial inoculation of rabies, were seen. Additionally, better means of differentiation between rabies and diseases such as tetanus and canine distemper were established. Treatment now involved mainly aggressive wound treatment. Lastly, more aggressive means were used to control the spread of this disease. Still, it would be more than one hundred years before the mantle of culpability for rabies was passed from dogs and cats to wild carnivores such as raccoons, foxes and skunks.

²³ J. Lane, "Farriers of Georgian England," in The Advancement of Veterinary Science, ed. A. R. Michell (Cambridge: C. A. B. International University Press, 1993).

CHAPTER 2: EARLY HISTORY OF RABIES

The disease that so worried John Neale had a long and involved history. Of all the diseases that attack both domestic animals and humans rabies is one of the best known. Its special notoriety is interesting when gauged against its minimal impact, both economically and medically, on human society. The domestic animal mainly affected was the dog, an animal whose economic importance, while valuable, could be argued to be less compared to that of horses and livestock.¹ Moreover, rabies had a minimal direct effect on human society. Despite this standing rabies has always enjoyed a rather high profile among diseases. Even today this disease has been the basis for a certain amount of hysteria. A number of low grade, low budget horror films and at least one fairly recent novel, Cujo, have been seen outlining the frightful nature of the disease.²

Rabies is one of the oldest of the diseases that attack both humans and animals. It is held by some that this affliction first manifested itself soon after the human species first domesticated the dog³. The first evidence for rabies in the written literature is supposedly a remark from the Mesopotamian Eskunna Law Code from approximately 2300 B.C.⁴. In it the following passage has been interpreted by a number of historians as referring to rabies.

If a dog is mad and the authorities have brought the fact to the knowledge of the owner, if he does not keep it in, it bites a man and causes his death, then the

¹ Harriet Ritvo, 167.

² Steven King, Cujo (New York: Viking Penguin, 1981).

³ William MacNeil, Plagues and Peoples (New York: Doubleday, 1984) 51-52.

⁴ Theodorides, 17-18 ; Frederick Rosner, Medicine in The Bible and The Talmud (New York: 50 KTAV Publishing House, 1977) ; H. Koprowski, "Rabies," in Textbook of Medicine, ed. P.B. Beeson and W. McDermott, 12th ed. (Philadelphia: Saunders, 1967), 50 ; Eugen Linden, "Beware of Rabies," Time, 23 August 1993, 58-59.

owner of the dog shall pay two thirds of a mina (40 shekels) of silver. If the dog bites a slave and causes his death he shall pay 15 shekels of silver.⁵

A closer examination of the original quote reveals that in all probability it was not dealing with a disease but rather with an antisocial animal. The original quote reads:

If a dog is *vicious* [my italics] and the authorities have brought the fact to the knowledge of its owner, (if nevertheless) he does not keep it in, it bites a man and causes his death, then the owner of the dog shall pay two thirds of a mina of silver.⁶

Thus one has the word 'vicious' instead of 'mad'.

It could be argued that vicious is simply a different word for rabid. There are two problems with this theory: first, if the animal was rabid why would the owner simply be obliged to restrain the animal and not to kill it. Did the ancient Sumerians, who drew up this law code, not understand the danger of this disease? They appear to have recognized it was dangerous enough to kill--in both cases the potential human victim is referred to as 'killed' and not just bitten.

Moreover, this description was part of a series of remarks involving general antisocial behavior in humans and animals. The dog was not the only animal mentioned in this law code ; also mentioned was the ox. It was noted: "If an ox gores another ox and causes its death both ox owners shall divide (among themselves) the price of the live ox and also the equivalent of the dead ox". This law code also included remarks about oxen that would today be classified as 'habitual criminals'. It was noted: "If an ox is known to gore habitually and the authorities have brought the fact to the knowledge of its owner, but he does not have his ox dehorned⁷ it gores a man and causes his death, then the owner of the ox shall pay two-thirds of a mina of silver.⁸

⁵ Harry Wain, A History of Preventive Medicine (Springfield, Illinois: C. Thomas, 1970) 238 ; Theodorides, 17.

⁶ Albert Goetze, trans. "The Laws of Eskunna," in Ancient Near Eastern Texts Relating to The Old Testament, ed. James B. Pritchard (Princeton, New Jersey: Princeton University Press, 1955), 161-165.

⁷ This may be the earliest documented case of veterinary surgery on even a limited scale.

⁸ Goetze, 163.

The interpretation of this earliest supposed reference to the disease is a superb example of the idea, seen well into the eighteenth century, that every dog that bit was rabid.

Remarks from later Mesopotamian literature are supposedly indicative of rabies being in the Near East by the beginning of the first millennium BC.⁹ An examination of these quotes reveals less-than-definitive descriptions of rabies. Remarks such as: " a lion becoming furious", "if a pig gives birth and its young are formed, she will become enraged and will bite", and " the furiousness of the lion and the wolf" suggest vicious animals, not sick ones.¹⁰ There are only two notations which might have referred to rabies. The first was an exorcism chant , written on a statue of a raging hound, that was used to cure illness.¹¹ That this chant was associated with the representation of a dysfunctional canine suggests the illness may have been furious rabies. The second involves a quote comparing the Assyrian King Sargon to a mad dog. It stated: "Sargon like a dog filled with madness".¹² It may refer to a rabid dog but it may also refer to the vicious dogs that accompanied the Assyrian armies.¹³

References to bites of dogs in one Egyptian medical Papyrus are believed to be dealing with rabies. The passages in question are found in a magico-medical papyrus entitled the Leyden Papyrus. Discovered in the early nineteenth century at Thebes this work, written in Greco-Coptic characters and found with other papyri written in Greek, has been dated to the first half of the third century AD.¹⁴ There is some evidence that some parts may be derived from earlier works but this is at best inconclusive.¹⁵ The

⁹ P. B. Adamson, "The Spread of Rabies into Europe and The Probable Origin of This disease in Antiquity," Journal of The Royal Asiatic Society of Great Britain and Ireland (1977): 141-144.

¹⁰ There is, though, the most curious reference, "if pigs were made furious" which suggests some sort of condition was causing behavioral dysfunction among more than one pig at a time. Was this possibly pseudorabies? see: Adamson, 144.

¹¹ Adamson, 141.

¹² Adamson, 143.

¹³ M. Hilzheimer, "Dogs," Antiquity 6 (1932): 415..

¹⁴ F. Ll. Griffith and Herbert Thompson ed., The Leyden Papyrus (New York, Dover Publications, Inc., 1974), 1, 10, 11.

¹⁵ There is, though, a most curious series of references in a medical papyrus from the New Kingdom--circa 1400 BC. Found in this papyrus are a series of treatments for the bites of

papyrus contains incantations for everything from serious medical problems to loss of sexual potency and fertility. Included among these are two spells designed to treat the bites of dogs. The first is as follows:

Spell spoken to the bite of the dog. I have come from Arkhah, my mouth being full of blood of a black dog. I spit it out, the ... of a dog. O this dog, who is among the ten dogs which belong to Anubis, the son of his body, extract thy venom, remove thy saliva from me again. If thou dost not extract thy venom and remove thy saliva, I will take thee up to the court of the temple of Osiris, my watchtower. I will do for thee the ... of birds, like the voice of Isis, the soceress, the mistress of sorcery who bewitches everything and is not bewitched in her name of Isis the sorceress. And you pound garlic with kmou and you put it on the wound of the bite of the dog; and you address it daily until it is well.¹⁶

The second spell is much like the first, though the treatment is different.

Spell spoken to the bite of the dog. . . . You cleanse the wound, you pound salt with---apply it to him. Another; you pound rue with honey, apply it; you say it also to a cup of water and make him drink it.¹⁷

One author, Dr. G. Charpentier, doubts that these were descriptions of rabies. Instead he believes they were simple cases of infection caused by the saliva being contaminated by the soil as a result of the animal digging up a bone.¹⁸ The evidence from both spells, as well as additional evidence from the papyrus, suggests, however, that they dealt with rabies.

numerous animals: pigs, crocodiles, lions, and even humans. There is no reference to treatments for dogbites, suggesting that even at this early date dogbites were considered in a class by themselves. Was this because they often led to rabies? See: George Reisner, The Hearst Medical Papyrus (Leipzig: J.C. Hinrichs, 1905), 1, 13; Chauncey D. Leake, The Old Egyptian Medical Papyri (Lawrence: University of Kansas Press 1952), 38, 97; J. Worth Estes, The Medical Skills of Ancient Egypt, revised edition (Boston: Science History Publications, 1993), 15.

¹⁶ Griffith and Thompson, 123-4.

¹⁷ Griffith and Thompson, 128-9.

¹⁸ Theodorides, 181.

The statement in the first spell "extract thy venom, remove thy saliva from me" indicates that the affliction was believed spread by a poison in the saliva of the dog, a belief that would closely approximate the late classical theory as to the cause of rabies.¹⁹ Comment as to what would happen if the venom were not removed: "I will take thee up to the court of the temple of Osiris"²⁰ strongly suggests the certain fatality of the disease once the symptoms appeared.

The only remarks as to clinical symptoms for rabies is found at the end of the second spell. The comment "you say (a prayer?) also to a cup of water and make him drink it"²¹ suggests the fear or avoidance of water was held to be a symptom. The belief that rabies in humans being clinically manifested by a fear or abhorrence of water was so prevalent in the classical world that for many centuries the disease was known by that symptom alone--hydrophobia. Associated with this belief was the idea that one could cure a human patient of rabies simply by forcing him to deal with his fear of water.²²

It is not clear when rabies came to be known to the ancient Hebrews. There is nothing in the early health regulations which deal with rabies, suggesting that while the disease may have been present it was not a major public health concern. One historian noted: "Had any such danger existed then surely among a people to whom the dog was an unclean animal it would have been magnified out of all proportion, if for no other reason than to explain and increase still further the deeply rooted abhorrence which was already felt for the canine."²³

When the Talmud, the Jewish civil and religious code, was developed around the second or third century A.D the mad dog came to occupy a prominent place. One of the few legitimate reasons for breaking the Sabbath was to kill a mad dog. It also provided a description of this creature: "Our Rabbis taught that five things were

¹⁹ Griffith and Thompson, 123 ; Amy Thomson and John Blaisdell, "From The Fangs of Cerebrus : The Possible Origin of Classical Beliefs about Rabies," Argos 11 (1994): 5-8.

²⁰ Griffith and Thompson, 123.

²¹ Griffith and Thompson, 129.

²² John Blaisdell, " Rabies in Shakespeare's England," Historia Medicinae Veterinariae 16 (1991): 22-23.

²³ R. H. A. Merlen, De Canibus, Dog and Hound in Antiquity (London: J. A. Allen and Co. 1971), 74.

mentioned in connection with a mad dog : its mouth is open, its saliva is dripping, its ears flap, its tail hangs between its legs and it walks on the edge of the road. Some say it barks without its voice being heard."²⁴ There was also an attempt to explain how this disease occurred. "Where does the dog's madness come from? Rab said, "Witches are having their fun with the dog," Samuel said" An evil spirit rests on it. . . ."²⁵

Anyone against whom a mad dog rubbed was in mortal peril and they should remove and destroy their clothes. One bitten by this creature would inevitably die. The only safe way to kill a mad dog was to stone it, if it were killed with a sword or an ax the evil spirit in the dog would pass into the man who dealt the blow and he too would go mad and die.²⁶ The treatment for someone bitten by a mad dog involved writing a chant to God on the skin of a male hyena, or leopard. Then the individuals should remove his clothes and bury them in a grave at a crossroads for a year. Then they should take them out, burn them in an oven and scatter the ashes. For the year after they were bitten they should only drink water out of a copper tube. This last action prevented them from seeing "the shadow of the demon", a possible reference to one's own reflection when one is supposedly suffering from rabies.²⁷

It is almost impossible to determine when rabies first appeared in Europe. There are supposed references to the disease in Homer's Illiad. Teucros refers to Hector as a "mad dog"²⁸. If this is an early identification with rabies then it must have been prevalent in Greece as early as 800 B.C. Neither Hippocrates nor Aristotle, the two foremost classical Greek biological and medical scholars, had much to say about this disease. Hippocrates noted persons in a frenzied state drank very little, were disturbed and frightened, trembled at the least noise and were often seized with convulsions. He never mentioned rabies specifically and since he wrote extensively on both mental illness and epilepsy one cannot be sure that this was not a reference to one of these conditions.²⁹

²⁴ Rosner, 50-51.

²⁵ Ibid.

²⁶ Merlen, 76; Rosner, 51 ; A. Sloan and A. Farquhar, Dog and Man.The Story of Friendship (New York: Benjamin Blom, 1971), 41.

²⁷ Rosner, 51.

²⁸ Theodorides, 23.

²⁹ G.E. R. Lloyd, ed. Hippocratic Writings (New York: Penguin Books, 1983), 237-51.

Aristotle's comments on rabies were more involved than those of Hippocrates. He noted dogs suffered from a disease, rabies, that produced madness. When the symptoms appeared, it killed all animals except man.³⁰ That Aristotle noted humans did not always die, even when the symptoms appeared, suggests he had known about hysterical rabies. Hysterical rabies arises more from the fear of the disease than from the disease itself. After he is bitten by an animal his imagination can become so active that he develops symptoms of rabies without having the disease. He may even go into a frenzy, barking and snapping like a dog; it is from this that rabies got the name 'doggy madness'. Actual rabies is incurable, hysterical rabies responds readily to any number of treatments, from standard medicines to quack cures.³¹ If Aristotle's writings are evidence of hysterical rabies then the fear and anxiety about this disease appeared very early in its history.

By later Greek and Roman times references to rabies were common. It appears to have been well known to huntsmen, agricultural authors, and late classical medical writers and practitioners. Later Greek and Roman authors, such as Pliny (d. 79 A.D.), Celsus, (fl. 1st century A.D.) and Galen (fl. 2nd century A.D.), provided elaborate discussions of the disease. All three came to the same conclusion: the disease was caused by a poison which came from the fangs of the mad dog.³² Pliny, a famed Roman naturalist, believed this disease occurred during the time of Sirius, the Dog Star. He wrote: "so virulent is the poison of the mad dog, that its very urine even, if trod upon, is injurious, more particularly if the person has any ulcerous sores about him."³³ Celsus, who wrote extensively on medicine, noted: "But especially if the dog was mad, the poison must be drawn out by a cup." He believed the bite wound must be kept open to allow the poison to drop out freely from it. Celsus also felt the administration of

³⁰ Aristotle, History of Animals, trans. D.M. Balme, 3 vols. (Cambridge, Massachusetts: Harvard University Press, 1991), vol. 3, p. 183.

³¹ H. W. Haggard, Devils, Drugs and Doctors (Boston: Charles River Books, 1980), 288-9.

³² For a more involved discussion of beliefs about rabies in late classical times see: Blaisdell and Thomson, 5-8.

³³ Pliny, Natural History, trans. J. Bostock, 6 vols. (London: H.G. Bohn, 1855) vol. 5, 406.

large amounts of wine, undiluted, was an antidote to this, as well as all other poisons.³⁴

Galen's comments on rabies were the most extensive of the three authors. He believed it was caused by a corruption of a particular humor in dogs. The disease would occur in humans if they come in contact with the affected animal's saliva. Galen was very specific that the saliva of the affected dog caused this affliction.³⁵ He referred to the affected humor as '*vitioso humore*;' this, plus his numerous antidotes for this corrupted humor, strongly suggests he believed it to be poisonous.³⁶

That all three authors concluded that rabies was caused by a poisonous substance suggests a common knowledge of some earlier work. Through a study of classical myth and language one may hypothesize that Pliny, Celsus, and Galen formulated similar, yet independent conclusions, as to the nature of rabies based upon their observations and interpretations concerning this mythical beast, Cerberus. Cerberus was called "the Hound of Hades" and appears in several works of the classical era. Those educated members of the late classical period certainly would have had a thorough grounding in Homer's Iliad, Hesiod's Theogony, Vergil's Aeneid, and Ovid's Metamorphoses, works that contain brief passages to this creature whose task it is to guard the underworld and whose most notable characteristic is his possession of multiple dog heads.

The myth of Cerberus originated in oral folklore; Hesiod and Homer gave it literary expression in circa 800-700 B.C. The origin of his name may be related to that of a mythical dog in Asian mythology, Karbaras, one of the two dogs of Yama, the Hindu god of death.³⁷ In the *Theogony*, a work dealing with the lineage of the gods, Hesiod traces the genealogy of Cerberus, who stands as pitiless guard of Hades and

³⁴ Celsus, De Medicina, trans. W. G. Spencer, 3 vols. (Cambridge, Massachusetts: Harvard University Press, 1938), vol. 2, 113.

³⁵ Claudii Galen, Opera Omnia, ed. Carolus Gottlib Kuhn, 43 vols. (Leipzig: Officina Libraria Cnoblochii, 1824), vol. VIII, 423.

³⁶ Galen, vol. VIII, 424, vol. XIV, 158, 170-71, 206.

³⁷ Adrian Room, Room's Classical Dictionary: The Origins Of The Names Of Characters In Classical Mythology (London: Routledge & Kegan Paul 1983), 88.

waits to devour anyone daring to leave. He is a descendent of the Medusa and one of the progeny of a half nymph/half snake creature, Echidna.³⁸

However the descriptions may vary of Cerberus, certain similarities remain consistent in the accounts: he manifests behaviors which the authors choose to modify as madness and he emits poisonous substances from his jaws. Several of the Latin word choices in the descriptions provide means for drawing implications. The utilizations of the words: *rabidus*, *virus*, *aconita*, and *spuma*, form a fascinating link between Cerberus, rabies, aconite poisoning, and the entire concept of virus as poison. The word *rabidus*, which can mean: raving, furious, enraged, savage, fierce, mad, or rabid, was used in reference to *canes* (dogs) as an adjectival in poetry and in post-Augustan prose.³⁹ It appears in 2.151 of the *Georgics*, by Vergil, in 5.892 of Lucretius' *De rerum natura*, and in Horace's *Ars Poetica*, 393. Another variation of *rabidus*, *rabiem*, which is the accusative case of the noun, *rabies*, and can mean rage, madness, frenzy, or fury, appears in Ovid's *Metamorphoses*. In this instance the Fury is bringing poisons to Ino and Athamus from the *spuma* (foam) from Cerberus' jaws.⁴⁰

Celsus in his work on rabies refers to it as *virus* ⁴¹, thus introducing this term into the field of medicine.⁴² Virus at this time refers not to a microorganism but to a poison or venom. While there is no reference to virus as a poison produced by Cerberus there is a reference to it being a poison produced by one of his relatives. Ovid uses the word *virus* to refer to that poison which has issued forth from Echidna, Cerberus' mother⁴³. Thus, through the familial tie, he associates *virus*, a poison or venom, with Cerberus. The word *virus* occurs elsewhere in Cicero's *Arati*

³⁸ Hesiod, *Theogony and Works and Days* (Harmondsworth, Penguin, 1973).

³⁹ E.A. Andrews, Ll.D., ed., *Harpers' Latin Dictionary* (New York: American Book Company 1907).

⁴⁰ Ovid, *Metamorphoses* (Baltimore: Johns Hopkins University Press, 1994), 4. 503-506.

⁴¹ Celsus, vol. 2, 112.

⁴² A. P. Waterson and Lise Wilkinson, *An Introduction to The History of Virology* (New York: Cambridge University Press 1978), 2-3 ; Alfred Grase, *A History of Experimental Virology* (New York: Springer-Verlag, 1991), 4.

⁴³ Ovid, 4. 503-506.

Phaenomen, 432, in Vergil's Georgics, 1.129 and 3.419, and in Ovid's Tristia, 3.10.64.

In yet another passage from the Metamorphoses, containing the words *rabida* and *spumis*, Ovid provides a specific term for this poison--*aconiton* or *aconitum* and later *aconita*, the neuter plural for the same word. Harpers translates *aconitum* as a poisonous plant, wolf's bane, monk's hood, or aconite. References to this word also appear in Vergil's Georgics, 2.152 and Lucan's Bellum civile 4.322-23. Aconite was early on recognized as a deadly poison. Dioscorides, a famous late Greek author on pharmacology, noted another name for this plant was wolfsbane. He wrote: "Aconitum. . .they use for the hunting of wolves, putting them into raw flesh, for being eaten by the wolves, they kill them."⁴⁴ The symptoms of aconite poisoning in both animals and humans include restlessness, excessive, often frothy, saliva, irregularity of heartbeat, impairment of vision and vocalization, anxiety, vertigo and eventually coma,⁴⁵ symptoms similar to those of rabies. It is possible that rabies may have been interpreted by the classical physicians as caused by a poison similar to aconite. It appears that even at this early date a number of scholars believed rabies or hydrophobia was caused by a poison, a belief that would reappear in during the Renaissance.

Pliny had a good deal to say about treating this disease. He based the success of one treatment, consisting of horseparley or dogrose, on the testimony of a soldier who, bitten by a dog, had cured himself in this manner.⁴⁶ Pliny also advocated incising the wound and applying raw veal to the incision. Lastly, he sometimes used ashes of river crabs in treating the affliction, a treatment also suggested by Dioscorides.⁴⁷ Pliny held that the disease could be prevented in dogs by cutting off a large piece of their tail, a

⁴⁴ Robert T. Gunther, ed. The Greek Herbal of Dioscorides (Oxford: Oxford University Press, 1934), 475-76; John M. Riddle, Dioscorides on Pharmacy and Medicine (Austin: University of Texas Press, 1985), 65.

⁴⁵ John M. Kingsbury, Poisonous Plants of The United States and Canada (New Jersey: Prentice-Hall Inc., 1964), 127.

⁴⁶ Pliny, vol. 5, 84 ; vol. 6, 210.

⁴⁷ Pliny, vol. 5, 331; vol. 6, 23; Riddle, 138.

preventive also advocated by a Roman agricultural writer named Columella.⁴⁸ Another Roman author, Gratticus, suggested removing the worm under the tongue--this is actually the frenulum--as another way of preventing the disease.⁴⁹

One of the most popular treatments for rabies in classical times was the feeding or applying of some part of the mad dog to the patient. Pliny suggested applying the ashes of the dog's head to the bite wound⁵⁰ while Dioscorides believed feeding the roasted liver of the dog to the victim decreased their fear of water.⁵¹ Feeding cooked liver was not the only way to decrease a victim's fear of water--Celsus also suggested throwing the patient unaware into a water tank. If they could not swim they should be allowed to sink under so they would swallow some water; if they could swim they should be pushed under. Inevitably the individual in question would be forced to swallow water. In this way the dread of water would be removed.⁵²

With the fall of the Western Roman Empire much of the emphasis on academic pursuits shifted to the Eastern Roman Empire. It was here that many of the earlier works were translated, first into Syriac and then into Arabic. It is also here that the earliest medieval writers dealt with rabies. Aetius, a sixth-century physician from Amida wrote extensively on the disease. His description of a rabid dog appears to have borrowed certain remarks from the Babylonian Talmud. According to Aetius, dogs who were rabid became mute and then delirious--eventually they were unable to recognize their own masters. They did not eat or drink but panted constantly. Their breathing was labored, their mouths constantly open, their tongue hung out and they discharged frothy saliva. Their ears and tail hung down and they appeared dull and sleepy.⁵³

⁴⁸ Pliny, vol. 2, 317; Columella, On Agriculture, 3 vols. (Cambridge, Massachusetts: Harvard University Press, 1954), vol. 2, 315 .

⁴⁹ Gratticus, "Cynegetica" in Minor Latin Poets, (Cambridge, Massachusetts: Harvard University Press 1968), 189.

⁵⁰ Pliny, vol. 5, 405.

⁵¹ Riddle, 138.

⁵² Celsus, vol. 2, 113.

⁵³ Aetius of Amida, Contractae Ex Veteribus Medicinae Tetrabiblos (Basileae: Hier. Frobenii and Nic. Episcopii, 1542), 287; Fleming, 19.

Aetius also described the disease in humans. He noted individuals are often unable to look at themselves in a mirror. Some humans afflicted with rabies, when they look into a mirror, believe they are seeing the dog that bit them.⁵⁴ Aetius advocated cauterizing the wound as a way of preventing the disease. He also suggested the ingestion of ground crayfish prepared during the time of the dog star Sirius. Aetius noted the fear of water could be cured by simple will power alone; he noted the case of a philosopher who, supposedly suffering from rabies, cured himself of the fear of water by forcing himself into his bath.⁵⁵ Another author of the period, Paul of Aegineta, distinguished between the form of hydrophobia due to the bite of the dog and simple nervous hydrophobia. The former, he maintained, was always fatal while the latter was easily treatable. Paul also determined the latter was caused by a poison that spread to all parts of the body.⁵⁶ Obviously, both Aetius and Paul of Aegineta saw cases of hysterical rabies.

The works of Aetius and Paul of Aegineta appear to have had some influence on the Arabic writers of the early medieval period who dealt with this disease. At least one Arabic writer, Jahai Ebn-Serapion, repeated Paul's work, nearly word for word. He believed, like Paul, that the disease caused by the bite of a mad dog was incurable. Serapion did suggest that one way to get patients to swallow water was to enclose it in a globule of honey.⁵⁷ Rhazes and Avicenna, two famous Arabic physicians, noted humans with rabies often barked like dogs; Avicenna even observed some tried to bite people. He noted he had once seen the body of a mad dog covered with pustules and its skin of an ashy tint. Rhazes wrote that patients often had a terrible fear of water and would be seized with convulsions when exposed to it. He further noted patients suffering from rabies often died of apoplexy, or heart failure.⁵⁸

At much the same time as Avicenna and Rhazes a Jewish physician named Moses Maimonides practiced in Spain. Born in Cordova, Spain in 1135, Maimonides became a physician while living in Cairo. Maimonides' seventh published medical work, his Treatise on Poisons and Their Antidotes, dealt extensively with dog bites.

⁵⁴ Aetius, 288; Theodorides, 44.

⁵⁵ Aetius, 289.

⁵⁶ Theodorides, 46.

⁵⁷ Theodorides, 23.

⁵⁸ Theodorides, 48-49.

Like many of the medical profession he believed all dog bites were poisonous. Maimonides did recognize a long incubation period for rabies, often as long as forty days.⁵⁹ He believed the best treatment for rabies was to prevent the poison from spreading from the bite wound throughout the body. Maimonides advocated sucking the poison out, after which the person doing the sucking should wash out his mouth with olive oil or with spirit of oil. If sucking was not advisable, then cupping should be attempted. Maimonides believed heated cups were highly advantageous because they combined the use of cupping and cauterizing at the same time. After such treatment a medicine should be applied to the wound that would draw the poison out.⁶⁰

In Europe in the 12th century rabies was treated with superstition and magic. It was about this time that the relics of St. Hubert, the patron saint of hunters, were claimed to be efficacious against rabies. St. Hubert was an early Christian missionary who spent much of his career converting pagans in the Ardennes forest. Soon after his death he became the patron saint of hunters; by approximately 1100 A.D. his relics, especially his keys, were held to have a special ability against hydrophobia.⁶¹ St. Hubert supposedly obtained his reputation as a treater of rabies from his curing a madman who broke up his congregation one day.⁶² Also, as patron saint of hunters and hunting dogs St. Hubert was prayed to when these animals fell ill.⁶³

It was his keys, more than anything else, that were considered effective against rabies. It was claimed they were given to St. Hubert by an angel, the latter assuring him they would have special powers over evil spirits. The association of rabies with evil

⁵⁹ Frederick Rosner, Medicine in The Mishneh Torah of Maimonides (New York: KTAV Publishing House, 1984), 1,9, 10.

⁶⁰ Rosner, 9.

⁶¹ F. G. Holweck, A Biographical Dictionary of Saints (London: B. Herder Book Co., 1924), 492-493; The New Catholic Encyclopedia (New York: McGraw-Hill Book Co., 1967), 182-3; J. F. Delany, A Dictionary of Saints (New York: Doubleday and Co. 1980), 291; D. H. Farmer, The Oxford Dictionary of Saints (Oxford: Clarendon Press, 1978), 198.

⁶² L. Huyghebaert, Saint Hubert, Patron Des Chassuers (Antwerp: Privately Printed, 1927), 142.

⁶³ W. Carew Hazlitt, Faiths and Folklore of The British Isles, 2 vols. (New York: B. Blom, 1965), vol. 1, 361; Blaisdell, Hist. Med. Vet., 1991, 35.

spirits suggests the early Christian scholars and healers received much of their knowledge, either directly or indirectly, from the ancient Jewish beliefs about the disease. The keys seem to have been used as much to cure dogs as to cure humans; there was even an apparatus developed to immobilize the canine when the keys were being used.⁶⁴ This immobilization was necessary because the key was usually heated red-hot before being applied to the bite wound. Thus, not only was divine intervention incurred but the wound was also cauterized. In time the key, little more than a piece of iron, was used mainly to sterilize the wound. Not only St. Hubert but also St. Lambert and his relics were thought to have the ability to treat rabies.⁶⁵

The existence of a strange creature may have been reinforced because of the symptoms of rabies, especially those symptoms seen in the wolf. It has been suggested that the early European beliefs in the werewolf were heavily influenced by the behavior of rabid wolves. There were a number of beliefs about werewolves, including one which claimed a demon took possession of the body of a real wolf and used it to attack livestock and humans. This theory sounds remarkably similar to the ancient Jewish beliefs on rabies in dogs. That the theory was accepted so readily may have been due in part to the behavior of rabid wolves. Such animals often show uncontrollable ferocity, especially towards humans. Louis Pasteur, the famous nineteenth-century French chemist, witnessed this phenomenon personally; at one time he was called upon to treat nineteen Russians who were bitten by one rabid wolf.⁶⁶ The terrifying symptoms of rabies combined with a deep ingrained superstition of the wolf helped reinforce the belief in a demonic wolf-creature who killed everyone in sight, a canine serial killer.⁶⁷

While there were occasional references to outbreaks of rabies in early medieval Europe--one such outbreak occurred in 1026 in Wales⁶⁸--little or nothing was written on the disease itself. This should not be surprising since little was written on medicine.

⁶⁴ Fleming, 1871, 25; Huyghebaert, 151-2.

⁶⁵ Blaisdell, Hist. Med. Vet., 1991, 35-36.

⁶⁶ Wain, 1970, 241.

⁶⁷ W. M. S. Russell and Claire Russell, "The Social Biology of Werewolves," in Animals in Folklore, ed. J. S. Porter and W. M. S. Russell (Cambridge: D. S. Brewer Ltd., 1978), 157, 159, 162-4; Charlotte F. Otten, A Lycanthropy Reader : Werewolves in Western Society (New York: Dorset Press, 1986), 138.

⁶⁸ Fleming, 20.

When medicine was written about, though, rabies was mentioned. A collection of Anglo-Saxon medical works contain numerous references to both the diagnosis and the treatment of rabies. Diagnosis was done by taking wheat kernels and laying them on the bite wound. Then these same kernels were offered to chickens. If the chickens did not eat them it was evidence the animal who made the wound was rabid.⁶⁹ Also seen in this collection were references to at least six herbs: bishopwort, waybread, vermenaca, beet, yarrow and attorlothe, that were given as treatments for the bite of the mad dog.⁷⁰

Most of the medieval works which discuss this disease in any length rely heavily on classical writings. As such, treatments from Greece and Roman works continue to be referred to well into the sixteenth century. Dog's livers, worms, and ashes of dog's heads are all accepted by medieval medical practitioners. A few aristocrats even attempted the practice of bathing their hounds in the sea as a preventive for rabies.⁷¹ A number of individuals did try to deal with this disease in a progressive manner. Petro D'Abano (1250-1316), who was professor of medicine at Padua, wrote on rabies in his De Remedus Venenorum. Bartholomeus Anglicus (ca. 1230-40) also mentioned this disease in books VII and VIII of his encyclopedic work De Proprietatibus Rerum. Additionally, Guy De Chauliac, one of the greatest of the medieval surgeons, mentioned in his writings the use of cautery and evacuations in treating rabies.⁷²

One medieval author who wrote on rabies was Albert The Great (1193-1279). Trained as a Dominican friar, he was professor of theology at Paris and bishop of Cologne before he wrote his work on natural history. Albertus wrote extensively on diseases in hunting birds, less so on diseases in hounds. Nevertheless, enough material survives to provide some idea about Albertus' beliefs on rabies. He believed if an animal became rabid it should be isolated; if the animal was a dog he should be suspended by his backpaws in a bath for nine days. After being removed from the bath the animal's head and body should be shaved and then smeared with beet juice. He

⁶⁹ O. T. Cockayne, Leechdoms, Wortcunning and Starcraft of Early England, 3 vols. (London: Holland Press, 1961), vol. 1, 93.

⁷⁰ Cockayne, 3, 7, 9, 21, 37, 149.

⁷¹ John Cummins, The Hound and The Hawk: The Art of Medieval Hunting (New York: St. Martin's Press, 1988), 30.

⁷² Theodorides, 56, 57.

should then be resuspended in the bath. If the dog eats at all during this period, his food should be marinated in beet juice and mixed with pitch of black elder. If the animal did not get better after this treatment within seven days he would never get better.⁷³

By the sixteenth century human and veterinary medicine took on a more modern look. Still, despite new beliefs in contagion and treatment, many of the old medical beliefs remained--most would linger on until the late eighteenth century. Three scientists and scholars, though, would give the examination of rabies a more modern look. The best known of the three, Ambrose Pare, was a famous surgeon of sixteenth-century France. Born in 1510, Pare received his surgical training in Paris. From 1537 to 1569 he served as a surgeon to the French army. Eventually, Pare settled permanently in Paris where he practiced and wrote about surgery. Pare's scholarly investigations were published in 1575 in a massive folio, entitled The Collected Works of Ambrose Pare⁷⁴, which contained examinations and comments on nearly every medical and surgical topic, including rabies.

Pare's work was overshadowed by another continental author, Girolamo Fracastoro, or Fracastorius. Born in 1478 in northern Italy, Fracastoro received his medical education at Padua. In 1525 he moved to Verona where he spent the rest of his life practicing and writing about medicine. Fracastoro is best known for giving Syphilis its name. It came from a poem he published in 1525 entitled Syphilis sive Morbus Gallicus; translated it read Syphilis or The French Disease. His most important work, published in 1546, was De Contagione Morbus et Eorum Auratome. It was one of the most progressive examinations of infectious diseases, including rabies.⁷⁵ For the first time disease causation was credited to animate objects called 'animalicules'.

One of the first references in English to Fracastoro was found in an early seventeenth-century work on rabies. Entitled A Declaration of Such Grievous Accidents as Commonly Follow The Biting of Mad Dogs, it was written in 1613 by an English

⁷³ Albert The Great, Man and The Beasts, trans. James J. Scanlan (New York: Medieval and Renaissance Texts, 1987), 84.

⁷⁴ Blaisdell, Hist. Med.Vet., 1991, 8.

⁷⁵ Blaisdell, Hist. Med.Vet., 1991, 9.

physician named Thomas Spackman.⁷⁶ It was one of the first, if not the first, monographs in English to deal exclusively with rabies. Very little is known of Spackman's life; it is evident from his book that he was a physician; he showed nothing but contempt for surgeons and apothecaries. He noted that at the time the book was published he had been practicing medicine for thirty years, so one could conclude he finished his medical education in 1583. Where he received his education, whether he graduated from medical college, where he was born and brought up are for the most part mysteries. From the remarks in the book, though, one can conclude he probably practiced in the county of Essex.⁷⁷

These three individuals were important because it is from their works that is obtained the first gleanings of modern beliefs about, and attitudes toward, rabies. The best evidence for modern attitudes is found in the beliefs as to the cause of rabies. Fracastoro believed that rabies was caused by a contagion of animalcules. He held that rabies germs were too large to pass through intact skin so to acquire this disease one's skin had to be broken, or lacerated, as would be seen with dogbite.⁷⁸ Pare believed the disease was caused by a poison. He did not believe the dog was most susceptible to this disease during the period of the Dog Star Sirius. Pare did feel rabies occurred when the melancholy humor of the body became corrupted.⁷⁹ Spackman, like Pare, believed rabies was caused by a poison that was produced by the corruption of a humor, specifically the choleric humor. Both Pare and Spackman put great stock in the humoral theory of disease which held that health depended upon the four supposed fluids, or humors, of the body: the sanguine, choleric, phlegmatic, and melancholic, being in balance; when they became unbalanced, disease occurred.⁸⁰

⁷⁶ The reference to Fracastoro in this work is found on p. 44 and deals with bleeding as an ineffective treatment for rabies. See: J. W. Barber-Lomax, "The Biting of Madde Dogges," Journal of Small Animal Practice I (1960): 101; Blaisdell, Hist. Med. Vet., 1991, 10.

⁷⁷ Blaisdell, Hist. Med. Vet., 1991, 11.

⁷⁸ Hieronymus Fracastorus, Contagion, Contagious Disease, and Their Treatment, trans. W. C. Wright (New York: G. P. Putman's sons, 1930), 127; Blaisdell, Hist. Med. Vet., 1991, 19.

⁷⁹ Thomas H. Johnson, The Works of That Famous Chirurgeon Ambrose Pare (London: Privately Printed, 1678), 470; Blaisdell, Hist. Med. Vet., 1991, 20.

⁸⁰ Blaisdell, Hist. Med. Vet., 1991, 3.

Pare, Spackman and Fracastoro all noted that the symptoms for rabies varied with the animal. With respect to humans, the main symptom was mental imbalance--in time most sick humans became delusional. Spackman and Pare also believed humans with rabies would howl like dogs; Spackman felt this was the reason rabies was known as "the doggish madness"⁸¹. Pare attributed these sounds to the pathological changes in the throat and a deficiency of fluid intake, all of which produced hoarseness.⁸² Spackman also attempted to correlate symptoms with gross pathological changes. He believed the poison, once it had entered the body, passed directly to the heart and liver, a belief also held by Fracastoro.⁸³ For all his modern attempts at patho-anatomical analysis Spackman still relied on an updated version of an Anglo-Saxon diagnostic test for rabies, evidence that well into the seventeenth century diagnosis of this disease was still as much folklore as scientific determination.⁸⁴

With respect to treatment three categories were recognized. First, there was treatment of the bite wound, second there was treatment of the individual before the symptoms appeared, and lastly, there was treatment after the symptoms appeared. It was agreed that cauterization of the wound was of primary importance. Spackman and Fracastoro both advised that if the patient was terrified of cauterization by hot metal other methods should be employed, including caustic medications. Spackman additionally suggested a tourniquet should be applied above the wound, if it was feasible, to prevent the poison from moving into the body.⁸⁵ If the wound was located in such an area where a tourniquet could not be applied then wound dressings and/or salves should be applied. While individual salves and wound dressings were widely varied, certain basic substances were consistently employed: vinegar, garlic, turpentine and salt were used as mild cleansing agents while honey, butter, and melted animal fat provided soothing and somewhat protective dressings.⁸⁶ Other substances were also

⁸¹ Thomas Spackman, A Declaration of Such Greivous Accidents as Commonly Follow The Biting of Mad Dogs (London: Eliots Court Press, 1613), 11-13.

⁸² T. H. Johnson, 471.

⁸³ Spackman, 27 ; Fracastoro, 127; Blaisdell, Hist. Vet. Med., 1991, 25.

⁸⁴ Spackman, 27.

⁸⁵ Spackman, 33-34; Fracastoro, 259.

⁸⁶ Blaisdell, Hist. Vet. Med., 1991, 28.

used ; for instance, Spackman believed in the efficacy of urine and pigeon dung (i.e. ammonia) as cleansers and dressings.⁸⁷

For general remedies bleeding was also advocated, mainly as a way to draw the poison out. Spackman believed it should be done on the lower part of the body.⁸⁸ Pare' and Spackman additionally suggested bathing as a general therapeutic measure. Both quote Aetius when referring to this measure.⁸⁹ Once the symptoms appeared the prognosis of these individuals differed considerably. Spackman held out little hope for recovery once the symptoms appeared; Pare', on the other hand, did not believe all was lost at this point; as long as the patient could recognize himself in the mirror the case was not hopeless.⁹⁰

The seventeenth century also witnessed the beginning of scientific investigation emerging from the Royal Society. Established in 1665 this organization encouraged active investigation in all areas of science; from medicine to mathematics to astronomy. The Royal Society had among its membership some of the most prominent intellectuals of the age ; men such as Leeuwenhoek and Newton. This society received a number of articles on rabies; most involved evaluations of cases in humans. One of the earliest of these was never published. Found among the classified papers it noted a maid who in 1625 came down with rabies after being scratched by a cat. Nine days later the lady began to show a fever. Over the next nine days her condition deteriorated to such an extent that she became delusional. A day or two before she died the maid was barking, grinding her teeth and even walking on all fours like a dog.⁹¹

Another article described two boys who came down with hydrophobia seven months after handling a dog that was bitten by a mad dog. The children, first exposed in October 1679, did not show symptoms until May 1680. From then until early September both boys exhibited numerous symptoms of this disease, at one point both barked and snarled like dogs. By the middle of September both youngsters had

⁸⁷ Spackman, 34-36.

⁸⁸ Spackman, 45.

⁸⁹ Blaisdell, Hist. Med. Vet., 1991, 31.

⁹⁰ Spackman, 59, 60 ; Johnson, 471; Blaisdell, Hist. Med. Vet., 1991, 32.

⁹¹ "Royal Society, Classified Papers, 1660-1740" Ms., no. 38 (1680), Library, Royal Society, London.

recovered completely.⁹² A third youngster, bitten in the face by a mad dog, was not so lucky. Three weeks after he was bitten the symptoms appeared. His condition very quickly deteriorated and some twenty-four hours later, after a period of barking and snapping at everyone who came near him, he expired.⁹³

The last case involved a man named James Corton who was bitten on his right hand by a mad dog. Six weeks later he began to complain of generalized pain. Soon after he became incapable of swallowing any liquids. This symptom appeared on a Sunday evening; thereafter his condition deteriorated so quickly that by Tuesday evening Corton had died in convulsions. The author of this article went into great detail as to possible means of treatment. All of them were of the classical mode and all appeared ineffectual.⁹⁴

The treatises of this period dealing with veterinary medicine contained numerous references to this disease. Unfortunately while the quantity of writing was extensive, the quality left much to be desired. This is because most of the authors were not veterinary practitioners. They were country gentlemen, local parsons and the assorted collection of quacks and snake-oil peddlers. Add that many of the writers were plagiarists, copying the superstitions and errors of earlier authors, and one has a literature that was a reflection of the poor state of veterinary science at this time.⁹⁵ There were occasionally some good authors, a number of them country-gentlemen. One of the most distinguished of this group was Thomas Blundeville.

Little is known of Blundeville's life. he appears to be well-educated ; he may have even attended Cambridge. Whatever Blundeville's background there is little question that he was well informed. He wrote about veterinary science. These writings were flawed at best. In a treatise on diseases of the horse he wrote that this animal not

⁹² Martin Lister, " An Observation of Two Boys Bit by A Mad Dog," Philosophical Transactions of the Royal Society 20 (1697): 246-8.

⁹³ Anony., " De Morsu Venenoso Canis Rabidi," Philosophical Transactions of the Royal Society 18 (1694): 24-5.

⁹⁴ Martin Lister, " A Remarkable Relation of A Man Bitten by A Mad Dog, and Dying of The Disease called Hydrophobia," Philosophical Transactions of the Royal Society 13 (1683): 162-170.

⁹⁵ Blaisdell, Hist. Med. Vet., 1991, 12.

only had little or no brain but that it also possessed a gall bladder.⁹⁶ Blundeville did have the good sense to consult one of the more prominent veterinary practitioners of the time, Martin Shelley, who probably provided Blundeville with some of the clinical aspects of the animal diseases mentioned in his writings.

At least Blundeville's writings, flawed as they were, were not plagiaries. Such cannot be said for two other veterinary authors of this period, Leonard Mascall and Gervase Markham. Both had chequered reputations as far as their veterinary works went. Mascall has been accused of being an unabashed plagiarist who never had an original idea.⁹⁷ It is believed that both his supposed birthplace, Sussex, and his date of death, 1589, were made up. In fact almost nothing is known about this gentleman except his supposed writings. Markham also produced works on veterinary science.⁹⁸ For all his interest in this field he appears never to have seen clinically any of the diseases he wrote about.⁹⁹

A fourth writer in this area, George Turberville, was one of the few to write works on animal husbandry that dealt exclusively with dogs. Born in 1544 in Whitechurch, Dorsetshire, Turberville received an excellent education. He was supposedly a fellow of New College, Oxford and a resident of the Inns of Court. No documented evidence exists, though, that he attended either. He was secretary to Thomas Randolph, ambassador to Moscow from June 1568 to the fall of 1569. After his return from Russia, Turberville settled in Dorset where he spent the rest of his life writing on a great variety of subjects¹⁰⁰. Much of his writings on animals were not his own, though. His remarks on canine pathology in The Noble Art of Venerie or Hunting

⁹⁶ Thomas Blundeville, The Four Chiefest Offices Belonging to Horsemanship, 4 vols. (London: Privately Printed, 1566), vol. 4, 12, 44-46.

⁹⁷ Sir Frederick Smith, The Early History of Veterinary Literature, 4 vols. (London: J.A.Allen, 1979), vol. 1, 196-7.

⁹⁸ Smith, vol. 1,

⁹⁹ Blaisdell, Hist. Med. Vet., 1991, 15.

¹⁰⁰ John Ershire Hankins, The Life and Works of George Turberville, (Lawrence, Kansas, University of Kansas Publications, 1910), 5-27.

were taken from a writer named George Gascoigne, who in turn took them from a 1561 work, entitled *La Venerie*, by Jacques de Fouilloux.¹⁰¹

The knowledge of rabies for some of the veterinary authors came from hearsay remarks and vague clinical descriptions from assorted farriers, dog- and horseleeches. These descriptions show, if not more accuracy, at least more originality. Turberville, for example, noted seven different types of madness, only two of which, the burning hot or desperate madness and the running madness, could not be cured. He further noted that the desperate madness involved the dog biting anyone he came in contact with. Eventually the animal's mouth turned black, his howl became hoarse and he expired in three or four days.¹⁰² The second kind of madness appeared to be less severe; in this case the venom for the bite was less toxic and the animals showed less of a tendency to bite. Unlike desperate madness this condition could continue for nine months before death occurred. Turberville's five other kinds of madness, all curable, involved depression and a lack of interest in eating; the afflicted animals often died of starvation.¹⁰³ Recent opinion has suggested that all five of these conditions may have been variations of distemper.¹⁰⁴

Turberville's beliefs were repeated in a late seventeenth-century article outlining several cures for madness in dogs. The author, Theodore Mayern, wrote that dogs were subject to seven types of madness of which only two were associated with hydrophobia--the other five were other diseases. Unfortunately, Mayern, in his attempts to distinguish one type of madness from another, relied solely on symptoms, a poor criterion for the diagnosis of rabies since any number of conditions can mimic this disease. Mayern described the general symptoms of these five 'other madnenses' as

¹⁰¹ J. B. Barber-Lomax, "The Cures and Medicines for All Diseases in Hounds," The Journal of Small Animal Practice 1 (1960): 297.

¹⁰² George Turberville, The Noble Art of Venerie or Hunting, adapted by G. Gascoigne from J.deFouilloux's La Venerie (London: H. Bynneman and F.C. Barker, 1575), 221-2.

¹⁰³ Turberville, 224.

¹⁰⁴ J. W. Barber-Lomax, "Cures", 197.

follows: "In them the dogs will not eat, not at any time when they are sick, but in these five, they live 8 or 9 days without hurting anybody and then die of hunger."¹⁰⁵

Some veterinary authors simply repeated the beliefs of classical veterinary authors. Thomas Blundeville used the Roman author Vegetius to describe four different variations of 'de furore', or rabies, in horses. The first, caused by corrupted blood with affected the panicles of the brain, was Appiosum, or out of sight and mind.

Blundeville believed only one side of the brain was affected with this condition.¹⁰⁶ The second condition, frenzie, was caused by the infection of the brain itself and resulted in the horse running into walls. The third type, Passio cardica, occurred when the disease affected the viscera of the animal, causing him to sweat profusely. The last, Rabiosus, occurred when the corrupt humour overheated the liver and blood, causing the animal to bite at himself.¹⁰⁷

Three of the four appear to be either fever or colic. The last, probably taken from Vegetius, may have been the classical description of pseudorabies. Despite his referring to the panicles of the brain, there is little evidence that Blundeville ever saw any gross pathological evidence associated with this disease. He did witness at least two clinical cases of 'rabie or de furore' in the horse. The first, referred to as melancholia, involved a horse that spent all day biting his manger. The creature refused to let anyone near him. Blundeville attributed this to corrupt melancholy humor. The second case involved a horse who bit a man so badly that he had three fingers crushed. The animal not only tried to bite anyone who got near him but also bit at himself as well. Blundeville wrote that treatment for this animal involved the creature being fitted with an iron muzzle.¹⁰⁸

The numerous veterinary authors provided a rather varied outline of treating this disease, everything from dealing with the wound to treating the animal. Blundeville and

¹⁰⁵ Sir Theodore Mayern, " An Account of The Diseases of Dogges, and Several Receipts for The Cure of Their Madnes, and of Those Bitten by Them," Philosophical Transactions of the Royal Society 16 (1686-87): 408-410.

¹⁰⁶ This obvious contradiction of his statement that the horse had no brain suggests that much of Blundeville's work was taken verbatim from earlier classical authors. Blundeville, vol. 4, 12.

¹⁰⁷ Blundeville, vol. 4, 12-13.

¹⁰⁸ Blundeville, vol. 4, 13.

Markham suggested goat and human dung as a dressing for the bite wound.

Blundeville also believed bleeding the animal around the legs would both draw the poison away from the head and bring the humor back into balance. He wrote : "Cause him to be let bloode in his legs abundantly which is done as I take it to convert the blood from his head". He also described blistering of the head but believed it was less efficacious than bleeding.¹⁰⁹ Markham advocated two treatments : the first involved placing the animal in a dark, quiet stall and feeding him barley meal while the other involved force-feeding the animal chicken dung. (The first treatment appears to have been taken almost word-for-word from Blundeville's treatment of tetanus in the horse.) Mascall believed an effective treatment was to give the medicine treacle as a purgative. He noted that it "fortefieth the body and wasteth venome."¹¹⁰ Treacle is described in a seventeenth-century pharmacopiea as "a hot dry medicine that pergeth violently."¹¹¹ Another somewhat later work notes that it is a rather innocuous compound--molasses.¹¹² Mascall also believed garlic to be effective against rabies. He described it as "contrarie to the venome and therefore it is called the husbandman's treacle."¹¹³ Lastly, Turberville advocated bathing as an effective treatment in dogs. He suggested dipping the animal eight or nine times into a bath rather than washing him in it.¹¹⁴

Some of the human and the veterinary practitioners still advocated folk treatments. Most were fairly innocuous. For example, Turberville noted a particular charm against canine madness: "make two little rooles wherein were written but two lynes and these be put down a dog's throat, which was bitten by a mad dog. . .this would preserve a dog from being mad". He was less than convinced, though, as to its efficacy.¹¹⁵ Despite his reluctance with this treatment such charms were still popular with the rural people.

¹⁰⁹ Blundeville, vol. 4, 14.

¹¹⁰ Leonard Mascall, The Government of Cattell (London: F.R.Jackson, 1619), 297.

¹¹¹ Nicholas Culpeper, Pharmacopica Londinensis (London: Peter Cole, 1659), 32.

¹¹² Thomas Palmer, The Admirable Secrets of Physick and Chyrurgery, ed. Thomas Forbes (New Haven: Yale University Press, 1984), 210.

¹¹³ Mascall, 297.

¹¹⁴ Turberville, 227.

¹¹⁵ Turberville, 227-8.

One of the most popular charms for treating rabies was the 'madstone'. This consisted of a stone or stone-like object which, when applied to the bite wound, would draw the poison out. Among the items that fell into this category were porous pebbles, aluminous shale, white feldspar and the bezoar stone, a concretion found in the digestive tract of various ruminants. What all these substances had in common was that they were porous and absorbent. After being moistened the stone was bound to the wound until either all the poison was drawn out or until the stone was saturated. It was then placed in warm milk at which time bubbles were supposed to appear. After the milk turned green the stone was ready to be used again.¹¹⁶ No less an individual the Elizabeth I possessed such a stone. The Church of Scotland, while it impugned most folk cures, exempted this treatment from condemnation because it believed it possessed certain healthy virtues.¹¹⁷

While among these sixteenth and seventeenth-century scientists and medical men there was still much said and done that mirrored the thoughts and actions of classical men, much was also new and novel. Gone were the classical practices of eating roasted dog's livers--the closest one came to this was Pare's belief that applying the hairs of the dog that bit you to the wound would draw out the poison.¹¹⁸ Other folk remedies, even the more innocuous ones of feeding pieces of paper with special prayers written on them to sick dogs and humans, were taken with much skepticism. Spackman did advocate the use of the madstone to draw the poison out of the wound.¹¹⁹ At least as far as therapeutics for rabies was concerned the established scientific attitude was in the seventeenth century beginning to move toward a more modern approach. Unfortunately, the problem of diagnosis still remained, it would return again and again to haunt much of the work done with this disease in the eighteenth and nineteenth centuries.

¹¹⁶ Thomas R. Forbes, "The Madstone," in American Folk Medicine, ed. Wayland H. Hand (Berkeley: University of California Press, 1976), 12, 15 ; Charles W. Dulles, "The Madstone," Journal of The American Medical Association 34 (1900): 1208-9 ; Wyndham B. Blanton, "Madstones," Annals of Medical History 7 (1935): 268.

¹¹⁷ G. F. Kunz, The Magic of Jewels and Charms (Philadelphia: J. B. Lippincott Co , 1915), 215 ; Blanton, 270.

¹¹⁸ Johnson, 471.

¹¹⁹ Spackman, 39-41.

CHAPTER 3: BELIEFS AND THEORIES OF RABIES IN THE EIGHTEENTH CENTURY

The eighteenth-century English medical profession was a profession in transition, moving from beliefs of disease as a general dysfunction of the human body to disease being a dysfunction of specific organs of the body. This was particularly true with respect to rabies. Initially many physicians and scientists held the disease was the result of 'inflammatory diathesis'. Later, as a result of evidence from autopsies of individuals who died of rabies the disease was seen as the result of neurological overexcitement. This last belief became the basis of therapeutics for rabies in the late eighteenth century.

For thousands of years the prevalent learned theory of disease causation was the humoral theory. The theory held that health existed when the humors, the four main components of the body-blood[sanguinous], phlegm [phlegmatic], black bile [melancholic] and yellow bile [choleric or bilous]-were in balance. A disease condition existed when one or more of these humors was out of balance, usually in excess.¹ Individuals who were sick often vomited partly digested food, expectorated mucus, and/or passed loose stools, no doubt contributing to the belief of the humors being in excess. The way to bring the humors back into balance was by removing the excess, usually by bleeding or inducing purging and vomiting in the patient.² By the beginning of the eighteenth century the humoral theory of disease had been replaced with a series of theories of a more mechanical nature.³

One of the most prominent of the early eighteenth-century scientists to advocate such beliefs was Hermann Boerhaave. Boerhaave was born on December 31, 1668 in the town of Voorhout, in what is now the Netherlands. His father was a minister of the local Dutch Reform church while his stepmother was the daughter of a minister so it seemed natural for Boerhaave to be destined for a religious career.⁴ He entered Leyden in 1684 and after six years of a classical education graduated in 1690 with a Doctorate of Philosophy. By then he had also

¹ Lloyd, 26.

² Lloyd, 35.

³ Robert Schofield, Mechanism and Materialism (Princeton: Princeton University Press, 1970), 49 ; Lester King, The Medical World of The Eighteenth Century (Chicago: University of Chicago Press, 1958), 59.

⁴ G. A. Lindeboom, Herman Boerhaave (London: Methuen and Co., Ltd, 1968), 12-16.

decided on a career in medicine.⁵ (Such a combination of careers appears not to have been unusual in Calvinist countries. In seventeenth-century New England there was a separate group of medical practitioners known as minister-physicians.)⁶ Boerhaave read the works of such famous Renaissance anatomists as Vesalius, Bartholin and Fallopius, attended the dissections by Anton Nuck, then Professor of Anatomy at Leyden,⁷ and immersed himself in the works of all the prominent medical writers from Hippocrates to Sydenham. He wrote his thesis for an MD and presented it at Harderwyck where he received his degree in July 1693.⁸

For the next few years Boerhaave practiced medicine in Leyden while giving private courses in mathematics. In 1701 he was appointed lecturer of medicine at the University of Leyden, in 1708 professor of botany and medicine. In 1714 he became one of the rectors of the university and physician at the St. Augustine's Hospital in Leyden, where he introduced a modern system of clinical instruction. In 1718 he was also appointed professor of chemistry. For a while Boerhaave held three academic chairs: Medicine, Botany and Chemistry.⁹ In 1729, though, his health failing Boerhaave resigned the chairs of Chemistry and Botany; until his death he retained his chair of Medicine. In 1737 Boerhaave began to show signs of heart failure, his condition worsened and he died on September 23, 1738.¹⁰

Boerhaave's physiological theories of disease involved the body's humours interacting with the solids. The proper interaction of solids and fluid constituted health, disease was the faulty interactions of these elements. For the solids pathology involved fibers being either too soft or too stiff. Conditions of excessive laxity or stiffness might affect one organ but not another; they might affect the lungs but not the liver. The cause of many serious diseases was excessive weakness of the vascular fibers which in turn often led to corruption of the organs

⁵ King, 60-61; E. Ashworth Underwood, Boerhaave's Men at Leyden and After (Edinburgh, Edinburgh University Press, 1977), 7.

⁶ John Duffy, The Healers (New York: McGraw-Hill Co, 1976), 21-22; Ola Elizabeth Winslow, A Destroying Angel (Boston: Houghton Mifflin Co., 1974), 12-23.

⁷ These dissections were held in December and January and were open to the public. According to Albert von Haller as many as four hundred people could attend these dissections at any one time. See: Lindeboom, 30-31.

⁸ Lindeboom, 38-41.

⁹ Lindeboom, 78, 111.

¹⁰ King, 62; Underwood, 8-9.

they served. Tuberculosis, then called phthisis, was caused by this condition.¹¹ Boerhaave also attempted to explain inflammation as a distention and redness of the tissues. This often produced an irritation of the nerve fibers which in turn caused a fever.¹² Thus for Boerhaave fever was the result of inflammation and not the cause of it.¹³

He applied these theories to rabies. Boerhaave believed this disease had both a nervous and an inflammatory nature.

It seems first to be, a nervous case, which most properly ought to be ranked with convulsions, which invade the bowels and their vessels; that from hence a defect is communicated to the blood and humors, which is very much resembling a gangrenous inflammation and that the seat of this evil is first about the stomach and neighboring parts.¹⁴

For all his mechanistic theories Boerhaave paid close attention to the anatomical changes in rabies cases. His writings go into some detail with respect to autopsies of human rabies victims.

The anatomy of bodies has shown, that the organs for swallowing are most times inflamed; that there is a bilious glew of several colors in the stomach; that the gall bladder is full of black choler; that the pericardium is quite dried up; that the lungs are surprisingly full of blood detained therein; that the heart is full of almost dried-up blood; the arteries are full, the veins empty.¹⁵

Boerhaave believed rabies was generally spread by contagion, though sometimes it could result spontaneously, from acute fevers. He recognized that all forms of animals could be afflicted by this disease, including birds such as turkeys and chickens. Of these only in the canines, such as dogs, foxes and wolves, could the disease arise spontaneously; "in these it invades chiefly from inward causes, without catching it from others."¹⁶ He further noted that the main cause of the disease was a rather potent poison:

¹¹ King, 77.

¹² King, 85.

¹³ Lindeboom, 280.

¹⁴ Hermann Boerhaave, Aphorisms Concerning The Knowledge and Cure of Diseases (London: W and J. Innys, 1724), #1142, p. 331.

¹⁵ Boerhaave, #1140, p. 330.

¹⁶ Boerhaave, # 1130-1133, p. 326.

There is scarce any poison that infects so many ways: for the slightest bite imaginable, only scraping and not deep enough to fetch blood; the contact of fresh froth, or even of such as has been dreid up for some time; the handling much of an instrument or the wound by which the animal has ben killed some time since; the eating of the meat or milk of a mad creature.¹⁷

Boerhaave's theories and observations were only partially accepted in eighteenth-century Great Britain. Many of the medical scientists held disease could be caused by a change in both the motion and the texture of the blood. One of the earliest advocates of this belief was Archibald Pitcarine, a sometime professor of medicine at the University of Edinburgh and at the University of Leyden.¹⁸ Pitcairne believed diseases was due to a change in the velocity, the quantity or the texture of the circulating fluids and that fevers were produced by changes in texture or particle size of the blood.

One of the most prominent of Pitcairne's students was Richard Mead, a prominent London physician and an early member of the Royal Society. Richard Mead was born on August 2, 1673 in Stepney England. When he was ten his father Matthew Mead, who was a Puritan minister, was accused of plotting against the Royal Court and was forced to flee to Holland. There Richard received his education : first at the University of Utrecht and later at the medical school at Leyden. From Leyden he went to Italy where in 1695 he received his M.D. from Padua. Among Mead's medical professors at Leyden was Boerhaave.¹⁹

After graduation from Padua Mead returned to England where he initially set up practice in his old home Stepney. In 1702 his most important work, A Mechanical Account of Poisons , was published. In 1703 Mead was appointed physician at St. Thomas Hospital, in London. That same year he was made a Fellow of the Royal Society. Thereafter, as Samuel Johnson remarked of him, he 'lived more in the broad sunshine of life than almost any other

¹⁷ Boerhaave, #1136, p. 327.

¹⁸ During that year one of Pitcairne's students was Herman Boerhaave. See: Schofield, 49.

¹⁹ Dr. Mattley, " Some Account of The Life and Writings of The Late Dr. Richard Mead," Gentlemans Magazine 24 (1754) 510-515; Norman Moore, " Richard Mead," Dictionary of National Biography ed. Leslie Stephen, 63 vols. (New York: Macmillian and Co., 1885), vol. 37, 181-186; William MacMichael, The Gold-Headed Cane (London: Kimpton, 1923), 39-111; E.M. McInnes, St. Thomas Hospital, 2nd ed. (London: Special Trustees St. Thomas, 1990), 70.

man.²⁰ In 1708 Mead became a member of the Royal College of Physicians. Seven years later he retired from St. Thomas Hospital. By 1718 he had, along with Dr. Caleb Coatsworth and Thomas Wadsworth, published the Pharmacopoeia Pauperum, a book which outlined economical prescriptions for the poor. In 1727 he was appointed physician to King George II. In 1744 he became the president of the Royal College of Physicians. So successful was Mead's medical career that in his later life he became known as both a collector and a philanthropist. Additionally, he assembled a magnificent library, a gallery of sculpture and an impressive collection of coins and antiquities. After a long and distinguished career, Mead died on February 16, 1754.²¹

Mead's comments about rabies are found not only in his Mechanical Account of Poisons but in a number of articles published in the Philosophical Transactions of The Royal Society. His earliest remarks appear in the 1702 edition of his book. He stated rabies was the effect of a violent fever which in turn was due to changes in the blood. These changes were in turn due to a hot, often putrid, ferment of the blood which caused a change in the cohesion of the corresponding parts of the fluid. This caused the blood to be weak and thus it would become agitated until some accidental alteration occurred.²²

Mead believed foaming at the mouth was due to a great quantity of the fermentative particles being passed to the salivary glands by the stomach and mouth.

No dog ever sweats; from whence it follows that when his blood is in a ferment, it cannot, as in other creatures, discharge itself upon the surface of the body, and therefore must of necessity throw out a great many saline and active particles upon those parts where there is the most constant and easy secretion; and such next to the miliary in the skin in us, are the salivary glands; for this reason much more spittle is separated in a dog when mad, than at any other time, and that very frothy, or impregnated with hot subtile parts.²³

Mead associated this condition with inflammation; he described a number of autopsies which evidenced the inflammatory nature of the disease. He noted that in one autopsy the lungs appeared red and the throat, stomach, and bowels bore the marks of the inflammatory venom ;

²⁰ McInnes, 70.

²¹ Moore, 185; Mattley, 514; McInnes, 70.

²² Richard Mead, A Mechanical Account of Poisons (London: R. South, 1702), 81, 83.

²³ Mead, 1702, 81.

in another the liver appeared inflamed while in a third the coat of the stomach showed an inflammatory mortification.²⁴

While Mead's belief in the causation of disease was, much like that of Boerhaave's, based on both the shape and the mechanical action of the poison particles, there do not appear to be any references to the shape and subsequent particular action of the rabies poison. There is, though, a most curious reference in a work by Henry Bracken, a physician-turned-veterinary practitioner. Bracken, in his writings on rabies, acknowledges Mead's work on poisons. This reference, plus his studying with Boerhaave, is reflected in a statement on counteracting the effects of the hydrophobic poison. Bracken noted: "All that we have to do is to break , blunt, or sheathe the pointed spiculae or little floating daggers which are contained in the venom infused into the wound."²⁵ This is, as far as I can tell, the only reference in English to the exact shape of the hydrophobic poison and it seems to be derived from the beliefs of Boerhaave and Mead.

As the eighteenth century continued there was a move from the fever being the symptom of the disease condition to it being a reflection of the type of disease. One historian noted that during the second part of the eighteenth century there was a move away from mechanical reductionism, in which causation is sought in undifferentiated matter, motion and forces, and a move towards a more vitalistic approach. The exact explanation for certain physiological actions--the mechanical actions of particles--is replaced with references to a vague 'aura' causing such actions. Moreover, there are now attempts to classify diseases according to their signs and symptoms.²⁶ There was less interest in determining the cause of fever and more in classifying it.

One of the more influential of these new classifying vitalists was William Cullen. Educated at Glasgow University and through medical apprenticeship, in 1744 he became the professor of medicine there. In 1756 he became professor of chemistry at Edinburgh. Cullen taught that the key to health and illness was the state of the nervous fluid; when this fluid is excitable there is life, when the fluid is no longer excitable death occurs. The cause of fevers was a state of debility in which the energy of the brain is diminished. In essence disease

²⁴ Mead, 1702, 87-88.

²⁵ Henry Bracken, Farriery Improved or A Compleat Treatise upon The Art of Farriery (London: J. CLark, 1738), 309.

²⁶ Schofield, 191-195.

depended upon whether the nervous system had the potential for excitation.²⁷ Cullen further believed diseases could be broken into different genera and species according to their signs and/or symptoms.

One of Cullen's strongest advocates was a Scottish physician, John Brown, who believed that the factor which separated inanimate matter from animate matter was excitability. When this excitability was of a proper state, good health existed; when it was either deficient or excessive, disease existed.²⁸ There were two types of disease states: those caused by excessive excitement and those caused by deficient excitement. The cures for those states were in direct opposition to each other; if one suffered from excessive excitement one received a debilitating treatment. If, on the other hand, one suffered from deficient excitement, then one received stimulating treatment.²⁹ One of the major factors in causing excessive excitement was too much blood in the individual. As such, one of the most effective treatments for this was venesection or bleeding.³⁰

One of the most prominent advocates of the excitation theories was the American Benjamin Rush. Probably one of the most prominent physicians in eighteenth-century America--he was one of the signers of the Declaration of Independence--Benjamin Rush was born in 1746 on a farm near Philadelphia. Due to family connections he was able to attend some very prominent educational institutions: first West Nottingham Academy and then the College of New Jersey (now Princeton). After graduating from the latter he then spent a five-year apprentice with Dr. John Redman, a distinguished Philadelphia physician.³¹

Rush then went to Edinburgh University where he obtained an M.D. in 1768. He returned to Philadelphia where he quickly became established as one of the preeminent physicians. Within a year of his return he was appointed professor of chemistry at the College of Philadelphia, now the University of Pennsylvania.³² During the Revolutionary War Rush became one of the Continental army's most important medical advisors. After the war Rush became prominent as an educator; by the end of his life he had trained hundreds, if not

²⁷ Schofield, 204-207.

²⁸ John Brown, Elements of Medicine (Philadelphia: William Spotswood, 1790), 3, 29.

²⁹ Brown, 45.

³⁰ Brown, 183

³¹ Carl Binger, Revolutionary Doctor, Benjamin Rush, 1746-1813 (New York: W. W. Norton and Company, Inc., 1966), 21-31.

³² Binger, 78.

thousands of American physicians.³³ Rush also postulated a theory of medicine that closely corresponded to Brown's overstimulation theory.³⁴

Rush's beliefs about rabies, heavily influenced by his theory of overstimulation, were outlined in his work Medical Inquiries and Observations. He believed the disease was characterized by a fever. He wrote: "The theory of the hydrophobia, which an examination of its causes, symptoms, and accidental cures, with all the industry I was capable of, has led me to adopt, is, that it is a malignant state of fever."³⁵ Rush based these conclusions on the fact that the symptoms seen in dogs : great heat, want of appetite, sleepiness, delirium and a dull, fierce, red, or watery eye, resemble those of a feverish condition.

In humans he held that hydrophobia, or fear of water, was not the disease but rather a symptom of a number of diseases such as typhus, tetanus, epilepsy, hydrocephalus and even simple hysteria. Primary was the bite of a rabid animal.³⁶ All of these diseases Rush attributed to a feverish condition; for the symptoms in all of them, chills, great heat, burning sensation in the stomach, irregular pulse, cool, clammy skin, delirium and convulsions, were indications of a malignant fever.³⁷ He wrote the feverish factor was because of the condition of the blood.

Blood drawn in the hydrophobia exhibits the same appearances which have been remarked in malignant fevers--slight traces of size, serum remarkably yellow. There are several other cases upon record, of the blood exhibiting . . . the same appearances as in common malignant and inflammatory fevers."³⁸

Rush also believed it was a fever because the time lag between the initial infection and the appearance of the symptoms.

³³ Rush's reputation was not solely due to his medical abilities. He also proved to be one of the most progressive thinkers in the American Colonies, advocating everything from a the abolition of slavery to the more humane treatment of animals. See: John Blaisdell, " Benjamin Rush and The Humane Treatment of Animals," Veterinary Heritage 13 (1990) 14-30; Binger, 173.

³⁴ Binger, 228-234.

³⁵ Benjamin Rush, "Observations upon The Nature and Cure of The Hydrophobia," in Medical Inquiries and Observations, 4 vol. (Philadelphia: J. Conrad and Co., 1805), v. 2, 306.

³⁶ Rush, v. 2, 304.

³⁷ Rush, v. 2, 307-8.

³⁸ Rush, v. 2, 311-12.

The hydrophobia partakes of the character of a malignant fever, appearing at different intervals from the time in which the infection is received into the body. These intervals are from one day to five or six months. The smallpox shows itself in intervals from eight to twenty days, and the plague and yellow fever from the moment in which the miasmata are inhaled, nearly the same distance of time.³⁹

Rush tried to try to provide an explanation for cases of hydrophobia that appear months after the initial infection. In these cases he believed the disease became 'an affection of the nerves'. He further held that in order for individuals to come down with hydrophobia after so long a period of time they had to be particularly susceptible to the disease. He noted: "Such a person is predisposed in common with other people to all the diseases of which the hydrophobia is a symptom."⁴⁰

A contemporary of Rush, James Mease, was one of the most prolific late eighteenth-century writers on this disease. Born in Philadelphia in 1771 he was educated at the University of Pennsylvania, receiving an A.B. in 1787 and an M.D. in 1792. Even before finishing his medical studies Mease had written on hydrophobia. In 1790 he published a short article on hydrophobia in the American Museum in which he examined the efficacy, or lack thereof, of certain medicines, such as Musk, Cinnabar and Ormskirk medicine. This was later expanded into an M.D. dissertation. Over the next twenty years Mease published a large number of articles and books on this subject.⁴¹

Mease's thoughts about rabies were often inconsistent with eighteenth-century medical teachings. While he relied heavily on the writings of earlier scientists and scholars for much of his information, he did not always agree with their conclusions. He believed in all creatures but the canines the disease occurred as a result of a poison being introduced into the body, generally by a bite wound. In canines the cause was often of an environmental nature : excessive heat or cold, putrid food, a deficiency of water and an inability of this animal to sweat. Any or all of these factors could cause the disease to arise spontaneously in these animals.⁴² Mease all but

³⁹ Rush, v. 2, 310.

⁴⁰ Rush, v. 2, 310.

⁴¹ William Snow Miller, "James Mease," Annals of Medical History VII (1925): 6-7 ; James Mease, "On the Hydrophobia," American Museum or Universal Register 8 (1790): 68.

⁴² James Mease, An Inaugural Dissertation on The Disease produced by the Bite of A Mad Dog, or Other Rabid Animal (Philadelphia: Thomas Dobson, 1792), 40-41, 55, 58-61, 111;

dismissed the belief in the inflammatory nature of rabies. Instead he adduced that it was of the nervous variety, comparable to tetanus. "From the erroneous ideas entertained concerning the cause of the convulsions which occur in this disease, Boerhaave and others have considered it as highly inflammatory. I have already shown that this disease acts on the nerves by a debilitating operation whereby they are deprived of their healthy vigor and tone.⁴³"

Mease noted the time lag between when one was bitten and when the symptoms appeared, while extremely variable, often years. He believed this was due as much to misdiagnosis as to a latent poison.

The length of time that elapses between the infliction of the poison and the appearance of the disease is very various. I am by no means, however, disposed to give credit to stories of years elapsing before the person became affected. Morgagni refers to . . . a case where twenty years intervened between the bite and the appearance of the disease; and also to another author, who says forty years elapsed; but I think these authorities may justly be suspected.⁴⁴

He provided extensive descriptions of the symptoms as well as a detailed analysis of the therapeutics, but little in the way of physiological explanation for the rabies virus' actions. He attempted to explain how rabies caused death in its victims. Following the work of Dr. Phillip Syng Physick, he concluded the main cause was suffocation, arising from spasmodic action of the muscles of the upper respiratory tract.⁴⁵

In later works Mease attempted to refute Rush's belief in the inflammatory nature of the disease by noting the lack of similarity of symptoms.

In reply to this doctrine of analogy between hydrophobia and malignant fever, if the similarity of symptoms, to a certain extent, be admitted, there still exists a dissimilarity of symptoms in many important particulars, which brings the disease in question to a nearer resemblance of what are called nervous than febrile affections; that, as to the interval between the application of the remote cause and the attack of the disease, as hydrophobia from canine virus, unlike malignant fevers, has been known to come on at

James Mease, An Essay on The Disease Produced by The Bite of A Mad Dog (Philadelphia: Thomas Dobson, 1793), 40, 54, 57-60, 115 .

⁴³ Mease, 1792, 111-12, 115-16; Mease, 1793, 107, 111.

⁴⁴ Mease, 1792, 41-42 ; Mease, 1793, 40-41.

⁴⁵ James Mease, The Domestic Encyclopedia, 5 vols. (Philadelphia: W.Y. Birch and A.Small, 1804), vol. 1, 289.

all at intermediate periods between ten days and nineteen months after the infliction of the bite.⁴⁶

He believed hydrophobia was similar in nature to tetanus, a nervous affliction, because both responded favorably to similar treatments--counter irritation⁴⁷

By the late eighteenth century the belief in rabies as an inflammatory disease had been all but replaced with that of rabies as a nervous affliction. This change in attitude is best reflected by an English physician, Richard Pearson, who examined both sides of this argument. He believed the main support for the disease's inflammatory nature was that the symptoms of rabies were similar to those of recognized inflammatory diseases. He noted that the gastric and pneumonic involvement in rabies is similar to what is seen in gastritis and pneumonia, diseases that were thought to be of an inflammatory nature. He also noted that the inability to swallow in rabies was similar to that seen in 'variolous sore throat' a disease also of an inflammatory nature. In cases of rabies, though, no local obstruction of the throat and esophagus is seen.⁴⁸ Pearson observed that many of the other symptoms used to denote the disease of an inflammatory nature were accidental. The pain in the epigastric region, initially thought to be due to increased action of the sanguiferous vessels of the stomach, was in fact due to the effect of spasm.⁴⁹ Another scientist summed up this belief. "From the symptoms enumerated it is evident that this disease belongs to the spasmodic class."⁵⁰

Physiological nature aside, it was believed that rabies was one of the few diseases that could be spread from animals to humans. One author noted: "Hydrophobia is perhaps the only infectious disease incident to brutes that is ever known to be communicated to man". He further concluded that the direction of spread was only one way--from animals to humans.

⁴⁶ James Mease, " Observations on The Arguments of Professor Rush, in favour of The Inflammatory Nature of The Disease produced by The Bite of A Mad Dog," Medical Repository 5 (1801): 51-52.

⁴⁷ James Mease, Observations on The Arguments of Professor Rush in Favor of The Inflammatory Nature of The Disease produced by The Bite of A Mad Dog (Philadelphia: William Young, 1801), 58.

⁴⁸ Richard Pearson, The Arguments In Favour of An Inflammatory Diathesis in Hydrophobia (Birmingham: R. Seeley, 1798), 14.

⁴⁹ Pearson, 5.

⁵⁰ Robert Hamilton, Remarks on the Means of Obviating The Fatal Effects of The Bite of A Mad Dog (London: C. Dilly, 1785), 108.

"Contagious diseases, incident to man, are never known to be propagated to brutes. Nor is there any clear proof of this disease being communicated from man to man, or from man to brute."⁵¹ Another individual, who also recognized the animal to human means of contagion, concluded that the disease was incapable of being spread to humans if the infected saliva was absent.⁵²

It was generally recognized that the saliva was the main agent of spread. Yet little was known about the infected saliva itself. One scientist noted: "Some attempts have been made to discover the nature of the canine poison by the help of microscopes and chemical experiments, but to no purpose."⁵³ Another scientist, though, believed the agent of spread had been identified in the saliva. He noted that some earlier researchers had seen insects crawling around in the saliva of mad animals and that at least one individual had described them as 'little animalcula, the heads of which resembled dogs.'⁵⁴ It was noted by one of the most prominent scientists of the eighteenth century that hydrophobia was caused by a specific poison, the site of which was probably the salivary glands.⁵⁵ A few scientists speculated on its possible degree of strength. One author noted: "The saliva of a rabid animal appears to be among the weaker poisons and, for the most part, to require a length of time to show its affects greater than any other with which we are acquainted."⁵⁶

Because of the belief of the poison being found in the saliva it was generally held that the major means of acquiring this disease was by the bite of a mad animal. One work summed up the belief with respect to contagion:

The disease, hydrophobia, to which every human is liable, is invariably occasioned by the bite of a dog that is affested with the canine madness. . . . This is communicated by

⁵¹ Anthony Fothergill, Essay on The Nature of The Disease Occasioned by The Bite of A Mad Animal (London: R.Crutwell, 1799), 171.

⁵² George Lipscomb, The History of Canine Madness (London: Privately Printed, 1809), 3.

⁵³ John Berkenhout, An Essay on The Bite of A Mad Dog (London: P. Elmsly, 1783), 33.

⁵⁴ Pierre Desault, A Treatise on The Veneral Distemper with Two Dissections, The First on Madness from The Bite of Mad Creatures, The Second on Consumptions, trans. John Andree (London: J. Clarke, 1738), 208.

⁵⁵ John Heaviside, "John Hunter on Poisons, 1780s (?)" Ms, Library, Royal College of Surgeons, London.

⁵⁶ Hamilton, 82.

the smallest quantity of the poisonous saliva from the teeth, and the most trifling puncture of one tooth will produce it.⁵⁷

Others held that the chances of acquiring the disease increased with the severity of the bite. One eighteenth-century veterinary scientist noted :

The biting of a mad enraged dog is not so poisonous as is generally supposed, but only as those creatures are apt to strike their jaws with great force whereby they sometimes wound and bruise the sinews and nervous parts.⁵⁸

It was probably for this reason that the bite of the wolf was considered more dangerous than that of the dog.⁵⁹

Many scholars and scientists believed that while the poison was mainly spread by the bite of an infected animal this was not the only means. One author noted: "The hydrophobia is an affection mostly occasioned by the bite of a mad animal, but is not peculiar to it, nor always attendant on it."⁶⁰ This was echoed by a second scientist who noted the disease could be spread by more than the bite. " It (hydrophobia) is said to be communicated by a scratch, by breath, by saliva taken into the stomach, or by coming accidentally in contact with a recent scratch."⁶¹ Another individual noted: "rabies is capable of being communicated not only by the bite but by the breath."⁶² One scientist attempted to explain this by noting that saliva coming from the salivary glands might stick to the tongue, the oral cavity or even the gums and if another individual's mouth came in contact with these features the disease could be spread.⁶³

The writings of earlier authors were used to explain this means of spread. At least four cases fit that scenario. The first involved a young woman who had her apron torn and slavered on by a mad dog who attempted to bite her. Soon after the lady attempted to repair her apron

⁵⁷ Anonymous, Sportsman's Cabinet (London: Printed for the Proprietors, 1803), 307.

⁵⁸ William Merrick, The Classical Farrier (London: Privately Printed, 1788), 389.

⁵⁹ William Babington and William Wavell, "Two Cases of Rabies Canina in Which Opium Was Given, without success, in Universally Large Quantities," Medical Records and Researches (1798): 129.

⁶⁰ Edward Barry, A Short Account of Hydrophobia and The Most approved Remedies Against It (London: Privately Published, 1796), 22.

⁶¹ Thomas Arnold, A Case of Hydrophobia, Commonly Called Canine Madness, from The Bite of A Mad Dog, Successfully Treated (London: C. Dilly, 1793), 197.

⁶² Lipscomb, 9.

⁶³ DeSault, 205.

before it was sufficiently cleaned. Imprudently she decided to cut off the ends of the thread by biting them off with her teeth. As a result her oral cavity came in contact with the venomous saliva and the poor woman died of rabies. In the second case the same scenario was seen, only this time instead of an apron it was a lady's gown. The third involved an individual who kissed his mad dog before he had the animal killed and subsequently died of rabies. The last involved a peasant who, suffering from the canine madness, knew he was soon to die. As such he desired to kiss his children goodbye, did so and soon after died raving mad. The children within a period of one week died of the same disease.⁶⁴

Many of the scientists did not accept these earlier works wholeheartedly. One author observed the theories about this disease postulated by both classical and contemporary scientists were not always correct. "Areteus and Boerhaave go farther, and affirm, that it (rabies) may even be communicated by the breath of a mad animal. Aurelian is of the same opinion and quotes us an example of it. Here, however, some room for doubt must remain."⁶⁵ This attitude was reflected in other writings on rabies.⁶⁶ Other scientists believed it did not take contact with the saliva to acquire rabies--one could also be infected by the scratches of mad animals. Those who believed the disease could be acquired in this manner tended to base their conclusions on classical works. One author noted: "Caelius Aurelianus claimed hydrophobia was caused by (scratches from) the nails of rabid animals. He mentioned a person becoming rabid from a slight wound received from a cock that was fighting." This same individual, though, hedged his bets with respect to this means of contagion when he noted that the claws first had to be licked by the rabid animal, thus imparting the infected saliva onto them.⁶⁷

Many scientists held that infected inanimate objects, in particular instruments used to kill mad dogs, could also spread this disease. One author, Thomas Moseley, noted:

It is affirmed that an instrument which has been used for killing a mad dog, if left unwiped, will retain for many years enough of the virus to communicate the disease. Schenckius relates the case of a young woman who unfortunately cut her finger while

⁶⁴ Hamilton, 22-25; Arnold, 180-182 ; DeSault, 206.

⁶⁵ Hamilton, 25.

⁶⁶ Arnold, 206.

⁶⁷ Thomas Moseley, On Hydrophobia : Its Prevention and Cure (London: Privately Printed, 1808), 41-42.

wiping a rusty sword which had been, some years before, employed to kill a mad dog, and died of hydrophobia.⁶⁸

He further believed acquiring the infection by an inanimate object was similar to being innoculated for smallpox.⁶⁹

One method of spread, by eating the flesh of infected animals, was generally discounted as very unlikely. One writer observed that the milk and flesh of cows bitten by rabid animals had been used with impunity.⁷⁰ At least one newspaper during an outbreak of rabies in New England in 1770 went out its way to address this concern:

We hear from Dorchester that a hog, bitten by a mad dog there about two days ago, who, after biting several others, died : the dog was killed. A short time after, the hogs that were bit by the other were killed ; some of which were buried, others were salted down, etc. This may serve as a hint to the public to examine what pork they purchase.⁷¹

If tainted meat caused little or no concern with respect to rabies the same could not be said for the kennels the rabid animals lived in. It was believed by a number of authorities that putting dogs in kennels that originally held rabid animals could cause the former to acquire the disease. One author observed:

Dogs are liable to this disease by being within the contagion of hydrophobia; as for instance, in kennels where dogs have died of that complaint. therefore it is not necessary for a dog to be bit, which is similar to inoculation for smallpox, to produce hydrophobia.⁷²

A second author not only repeated the concern but also provided suggestion for dealing with this problem.

The purification of kennels is one method of preventing the dissemination of this malady. Fumigation has been employed, (using such substances as) Frankincense, Rosin, Pitchtar, etc. Whitewashing the walls with lime supersaturated with acids is

⁶⁸ In all probability this and the case of the individual who acquired his infection via cat scratch were not rabies but tetanus. see Hamilton, 26.

⁶⁹ Hamilton, 32.

⁷⁰ Fothergill, 19.

⁷¹ Essex Gazette (Salem, Massachusetts) 18-25 December 1770.

⁷² Thomas Whitney, Hydrophobia. A letter to Mr. Thomas Lee, on The Nonexistence of Hydrophobous Virus, (Bristol: Pine and Mills, 1807), 14.

undoubtedly a commendable practice; and utmost care should be taken to wash away every particle of filth, which might have been left by the diseased animals.⁷³

The one means of spread that was never discussed was in-utero infection. this was curious because in at least one instance the possibility of testing this means of contagion presented itself. A dog who was supposedly mad mated with a bitch. The latter was later found to be with puppies; before she could give birth, though, she was destroyed, thus eliminating the possibility of determining in-utero passage.⁷⁴

It was universally held that the poison causing rabies was similar to that which caused smallpox. One scientist observed: "The venom of the rabies resides in the saliva . . . it enters into the blood through an opening made by the mad creature's teeth much after the manner of inoculating the smallpox."⁷⁵ The possible relationship between rabies and smallpox continually reoccurred in the eighteenth-century medical literature. One scientist noted the ability of some individuals to avoid acquiring rabies even after they were bitten by a mad dog compared with the ability to resist catching smallpox. "We find the same peculiarity of constitution resists the variolous virus."⁷⁶ Many have been repeatedly inoculated for the smallpox without effect."⁷⁷ He observed that the same process, inoculation, ought to be tried to prevent rabies.

If, as the literature suggests, there was recognized a relationship between the cause of rabies and that of smallpox why did no one attempt a vaccine for rabies, in dogs at least, using the infected saliva of perviously rabid animals. The main reason was the prevailing belief that dogs did not generally acquire rabies by being bitten; rather the disease occurred in these animals spontaneously. One author noted:

With respect to spontaneous rabies I saw an instance in which that disease took place, and proved fatal, where not the most remote suspicion of its being caused by an animal bite could be entertained ; nor could it be accounted for by any means, But

⁷³ Lipscomb, 48-49.

⁷⁴ Dr. William Butt, Some Remarks on The Hydrophobia; and on The Efficacy of The Ormskirk Medicine for The Bite of A Mad Dog (Genoa: Privately Published, 1789), 90.

⁷⁵ DeSault, 205-6.

⁷⁶ The term 'virus' in the eighteenth century meant a poison. The association of this word with poison dates back to the classical period. There is some evidence that because the symptoms seen with aconite poisoning resembled the symptoms of rabies and tetanus it was assumed both diseases were caused by poisons. See : Thomsen and Blaisdell.

⁷⁷ Hamilton, 81.

whatever the cause, death was the consequence in two or three days after the first appearance of this symptom.⁷⁸

Another author observed that while the disease was caused by the bite of a mad animal this was not the exclusive cause." The hydrophobia is an affection mostly occasioned by the bite of a mad animal, but it is not peculiar to it, nor always attendant on it."⁷⁹

It was believed by many that peculiar circumstances, such as long continued heat or cold, would predispose an animal towards acquiring the disease. Other factors, such putrid meat, want of water, and proper exercise would also bring on the disease. One scientist noted:

In dogs peculiar circumstances may generate it [rabies], independent of the bite. Long continued heat, and also long continued cold, may predispose, in a certain measure, to its production; if to this be added putrid meat, want of water, and proper exercise; these will be other powerful concomitant causes.⁸⁰

No less a physician than Benjamin Rush held that cold night air, impure food, great thirst, worms, inflammation of the stomach, and even the eating of beech nuts could cause an animal or human to develop hydrophobia.⁸¹ Another author noted: "This disease is observed most frequently after long, dry hot seasons and among such dogs as live upon stinking carrion or as are confined in bad air and not supplied with a sufficient quantity of fresh and wholesome water."⁸² Still another author held that dysfunctional personality could bring on the disease:

When it is recollected that (anger) is an affection peculiar to dogs . . . it should not be forgotten that irascibility belongs to the dog as a characteristic principle. The dog is more prone to anger than any other domesticated animal. the slightest noise produces emotions of rage, which do not appear to belong necessarily to that vigilance for which the canine race has been much distinguished and celebrated.⁸³

This belief may have led to the death of at least one innocent dog, dog-wolf cross, who belonged to John Hunter. Hunter noted the animal had certain behavioral traits that were unusual: "actions that were not truly those of a dog; it had more quickness in attending to thing,

⁷⁸ Thomas Howlston, M.D., Observations on Poisons (Edinburgh: Privately Published, 1789), 89.

⁷⁹ Barry, 22.

⁸⁰ Hamilton, 149.

⁸¹ Rush, vol. 2, 303-304.

⁸² Barry, 22.

⁸³ Lipscomb, 6.

was more easily startled, as if particularly apprehensive of danger. . . not so ready to the call, being less docile". Because of these behavioral traits the animal lost its life in the streets, being stoned to death as a mad dog.⁸⁴

The factor that hot weather was a possible cause was a result of the lack of sweat glands in a dog which produced an excess of salivation in these animals. It was generally believed that the lack of pores in the dog's skin led the animal to retain his sweat and subsequently caused the body fluids to become more acrid, a situation which was believed to be a predisposing cause of rabies.⁸⁵ This change in an animal's chemistry as a cause of rabies was held by many eighteenth-century scientists and scholars. One author noted: "whenever a dog . . . is kept from drink, either during the excessive heat of the summer, or the sharp cold of the winter, his bile acquires such an extraordinary degree of acrimony, that he goes mad."⁸⁶

Because heat was considered a major factor it was believed that the disease was 'endemic' to the West Indies . Yet, in fact, rabies appears to have come late to this region of the New World.⁸⁷ Moseley noted the earliest supposed case of this disease in the British West Indies. In 1741 in the Barbadoes a cow came down with hydrophobia but was cured by pouring a pailful of cold water down her throat. Mosley further noted that a gentleman named Pouppe Despoutes, who practiced medicine in Hispaniola from 1732 to 1743, never saw a case of this disease.⁸⁸

He observed that spontaneous madness broke out in the West Indies in 1783.⁸⁹ It appeared in the spring in Hispaniola and by June had reached Jamaica, where it raged until March 1784. During the course of the disease not only animals but also humans, especially slaves, were affected. Moseley wrote: "A Boy of Mrs. Inglis in Kingston was bitten by a mad

⁸⁴ John Hunter, " Observations Tending to Show that The Wolf, The Jackal and The Dog Are All of The Same Species," Philosophical Transactions of the Royal Society 77 (1787): 255 ; John Blaisdell, "John Hunter (1728-93) and Rabies," Veterinary Heritage 12 (1989): 26.

⁸⁵ Hamilton, 149.

⁸⁶ Daniel Peter Layard, An Essay on The Bite of A Mad Dog (London: J. Rivington, 1762), 10.

⁸⁷ Moseley, 24.

⁸⁸ Moseley, 1808, 25.

⁸⁹ Moseley, 1808, 26.

dog . . . four months later the boy was seized--- and died on the third day."⁹⁰ Additionally, a lawyer and one of his slaves were also bitten but both survived. Many animals, hogs, sheep, goats and horses, were also bitten; for the most part they died mad. One horse was bitten and became mad: 'beating his head against a wall until he killed himself'. All this was attributed to a peculiar influence of the air.⁹¹

Attempts were made to control the disease by controlling the dog's environment. In Venice it was generally believed the disease was caused by excessive thirst; as such, many merchants kept a pan of water by their doors, particularly during hot weather, for the dogs.⁹² One author outlined a series of measures he believed would prevent the disease in dogs:

The proper preventive is a due attention to the food and drink of dogs. It ought to consist of a proper proportion of animal and vegetable substances, blended together, and deprived by boiling of a tendency to immediate putrefaction. It has been suggested that potatoes, and other farcinaceous substances, afford the most wholesome nutrient. But when conjoined with a portion of meat they are undoubtedly better calculated to sustain the strength and vigor of the animal. Cleanliness and exercise are also essentially necessary to the health of dogs, consequently to the prevention of disease . . . Sufficient attention has not been paid to these particulars, either among domestic dogs, or those confined in kennels.⁹³

These beliefs, were only partly based on classical writings; some of the more accomplished scientists based them on research results. Individuals such as John Hunter, Guy Babington, Henry Cline and Ashley Cooper, who had strong reputations in both clinical and experimental medicine attempted to inoculate animals, particularly dogs, with infected saliva and thus artificially produce this disease. One author provided summary of these experiments.

The Late Mr. John Hunter relates his having formerly inoculated other animals, both with variolous and syphilitic matter, without producing any symptoms of the respective diseases.

⁹⁰ Moseley, 1808, 27.

⁹¹ Moseley, 1808, 28.

⁹² Moseley, 1808, 26.

⁹³ That this author refers to two types of dogs, those of the domestic variety and those found in kennels, suggests that it may have been held by some that dogs kept as companion animals were considered more 'socially refined' than their working cousins. See: Lipscomb , 57.

Dr. Vaughan inoculated a dog with the saliva of a rabid dog, without effect.

Dr. Babington and Mr. Cline, we hear, lately performed a similar experiment, by inoculating a dog, three rabbits and some fowl with the saliva taken from a person in the last stages of hydrophobia.

Mr. A. Cooper repeated this experiment on a healthy dog, with saliva taken from a dog that died mad.

He further noted a universal lack of success with respect to these inoculations.

In none of these experiments did any of the inoculated animals, at the expiration of two or three months, discover any signs of infection. The dog last mentioned, even at the end of twelve months, remains perfectly well. (In short) the saliva of a mad dog, says Mr. Bruce, has been given to animals and has not affected them.⁹⁴

Another scientist also noted the lack of success with respect to artificial inoculation: "A dog has been inoculated with the saliva of a hydrophobic person. . . without receiving the smallest injury."⁹⁵

For two of these individuals, William Babington and John Hunter, this research probably led to the conclusion that in some cases rabies was spontaneous in nature. The first, William Babington, was a physician who had a long relationship with both Guy's and St. Thomas's hospitals. At the time Guy's, in particular, was renowned for having associated with it some of the foremost medical scientists in London. Men such as Henry Cline and Astley Cooper would go on to set the standard for medical science in nineteenth-century London and even North America; one of the most prominent of the early nineteenth-century American surgeons and the first to use ether in a surgical operation, John Collins Warren, trained with Astley Cooper at Guys,⁹⁶ Babington himself joined the staff of Guy's in 1795 and very quickly rose to become one of the most popular and respected of its attending physicians. So

⁹⁴ Fothergill, 171-2.

⁹⁵ Arnold, 182.

⁹⁶ Harold Ellis, Surgical Case-Histories from The Past (London: Royal Society of Medicine Press, 1994), 14, 136-8 .

well liked was Babington that when he died a statue in his memory was placed in St. Paul's Cathedral, where it is even today.⁹⁷

Babington was a prominent member of the Guy's Hospital Physical Society, a local medical society associated with both Guy's and St. Thomas's Hospitals. First established in 1771, this organization continued until 1852. The Guy's Hospital Pupil's Physical Society is an offspring of this.⁹⁸ Among the early members were Astley Cooper and Henry Cline, two prominent medical scientists who also attempted the artificial inoculation of rabies. The Physical Society Minutes, while they contain numerous references to rabies, do not mention any attempt at the artificial production of the disease. It could be argued that this was due mainly to the society being interested only in clinical cases and not in experimental medicine. Unfortunately, the occasional reference in the minutes to William Coleman, the future first professor of the Royal Veterinary College, engaging in experimental blood transfusions, do not support the clinical cases / no experimental research hypothesis.⁹⁹

When rabies is mentioned William Babington is noted as one of the major investigators. The interest in rabies in the Babington family appears to have been somewhat hereditary; William Babington's son, Guy Babington, who in 1831 became assistant physician at Guy's, is known to have also performed research on the disease.¹⁰⁰ While there is no mention of Babington engaging in artificial inoculation in the Minutes of the Physical Society there is an extensive discussion of this practice in his writings. In one article William Babington describes at great length his attempt artificially to produce this disease in healthy animals:

I had a few years ago, with the assistance of my friend Henry Cline, an opportunity of taking saliva from a person in the last stage of canine madness and inoculating with it, a dog, three rabbits and several fowl. In none of these instances was there, after three months, the least appearance of the disorder.¹⁰¹

⁹⁷ Sir William Hale-White, "History of Guy's Hospital," Guy's Hospital Gazette Special Bicentenary Edition (1925): 29-30.

⁹⁸ J. M. H. Campbell, "The History of The Physical Society," Guy's Hospital Gazette Special Bicentenary Edition (1925): 107-8.

⁹⁹ "Minutes, December 1784" Ms. Physical Society, Guy's Hospital Medical School Library, London. ; J. Wall, "The Guy's Hospital Physical Society (1771-1852)," Guy's Hospital Reports 123 (1974): 167.

¹⁰⁰ Hale-White, 31 ; Wall, 166.

¹⁰¹ Babington and Wavell, 136.

The case involved a dog owned by a gentleman named Chaplin. In August 1788 he was bitten by a supposed mad dog. Within twenty-five days the animal showed all the symptoms of rabies and was immediately confined, dying five days later. Babington had the animal's remains removed to St. Thomas Hospital where an autopsy was performed. The dissection revealed some inflammation of both the internal coat of the stomach and the pharynx but little else in the way of gross pathology. At this point Babington took a quantity of the saliva and injected it into a dog, a pig, a fowl and a rabbit.¹⁰² The procedure involved using a lancet to place two or three drops of saliva under the skin of the inner part of the thigh of each animal. Some four days after this procedure the rabbit was accidentally killed. The dog and the fowl, though, were confined for nine weeks and the pig for seven without any appearance of the disease. The dog later became the property of a gentleman who noted that there was never any evidence of the disease.¹⁰³

If Babington's experiments and subsequent conclusions seem fairly straightforward those for John Hunter are somewhat more obscure, as there is a lack of documentation for Hunter's research in this area. There is no question but that John Hunter gave great thought and concern to rabies. His writings, and those of his students and colleagues, note a number of cases of supposed rabies and further note that his attempts at treating them were not always successful. In spite of this, or maybe because of it, he had extensive experience with the autopsies of those cases that ended in death.

While Hunter's involvement with the clinical aspects of rabies is well documented, the records of his engaging in experimental research on this disease are often lacking and those that are present are at best cryptic. It was believed by a number of authorities that Hunter had at one time experimented with the artificial inoculation of turkeys for rabies. At least one author noted this conclusion may not be entirely true. :

¹⁰² The fact that Babington seems to contradict himself in this article, mentioning three rabbits and several fowl in one place and one rabbit and one fowl in another, can probably be explained by the fact that Babington may have attempted this procedure more than once. Why the other experiment is not mentioned one cannot be sure ; it may have been in that case Babington was the assistant rather than the primary researcher.

¹⁰³ There is a pair of general references to a paper on rabies by someone named Dodd but this appears to correspond more to observations on the clinical aspects of the disease. Otherwise, there is nothing in the "Minutes" of the Physical Society for the second half of 1788 that could possibly correspond to this research See: Babington and Wavell, 136-138.

The great Mr. John Hunter paid great attention in investigating the nature and treatment of hydrophobia. . . . He had the firm belief in the existence of hydrophobus virus, which he repeatedly demonstrates [is] a poison, capable of producing the disease in man. His allusion in his lectures to the experiments on turkeys by inoculation with the saliva of a mad animal, show the disease may be communicated by an incision charged with hydrophobus saliva. It may be necessary to correct a mistake in saying Mr. Hunter experimented on turkeys. I have it from the first authority to say that Mr. Hunter never made any experiment with the hydrophobus virus but that he had met with experiments by an able anatomist, where the disease had been produced in turkeys by inoculation.¹⁰⁴

This is followed by an even more curious statement: "Says Mr. Hunter, in his experiments with hydrophobus saliva, employed a most mortal poison which occasioned the most dreadful convulsions."¹⁰⁵

Who was this anatomist who demonstrated to Hunter that rabies could be artificially produced in turkey's? The writer does not say. Moreover, if Hunter was a witness to such experiments how does one explain the statements by him quoted in the lecture notes of his students? In one it was noted:

The cancer is a poison or disease that arises spontaneously . . . and the hydrophobia is another that arises spontaneously though this most commonly when it arises of itself affects only the dog."¹⁰⁶ While in another one: " The hydrophobic poison is said to continue to arise spontaneously. Mad dogs are chiefly in England and I really think that every dog here should be killed and new ones brought in. . . ."¹⁰⁷

Hunter is saying that this disease appears spontaneously in dogs, without inoculation with poison.

Additionally, found among in the notebooks of Hunter's students are some very curious remarks. In one, among a series of references to experiments involving dogs and toxins, there is the following curious statement: "Extraneous matter introduced into the blood does not produce any specific disease". In the very next lecture it is noted that the throat is the

¹⁰⁴ Whitney, 30.

¹⁰⁵ Whitney, 46.

¹⁰⁶ Heaviside, 9.

¹⁰⁷ J. F. South, "Lectures on The Principles of Surgery by John Hunter, 2 vol., 1786" Ms, vol. 2, 267, Royal College of Surgeons, London.

site of affection in canine madness.¹⁰⁸ One would believe this to be just a coincidence except that in another set of lectures, dating from 1786, the remarks on experiments on dogs and the throat being affected in canine madness are found in the same lecture.¹⁰⁹

Hunter may have been involved in two sets of experiments attempting the artificial transmission of rabies in animals. The first, involving turkeys, proved successful, while the second, involving dogs, did not. If Hunter was unable to produce the disease artificially in dogs using infected saliva how was he to explain the disease naturally occurring in these creatures? No doubt, Hunter assumed the poison occurred naturally in certain dogs. Hence his suggestion in the other lecture notes that all British dogs should be destroyed and new ones brought in. Hunter probably believed British dogs had a natural predilection towards this disease. The last question, who was the anatomist that performed the experiments on turkeys, at present can not be answered. It can be speculated, though, that it may have been his brother William with whom John spent so much time.¹¹⁰

Hunter was not the only one who failed to produce rabies artificially in the dog, many of his colleagues had the same lack of luck. These experiments, for reasons that are not clear, while they worked on rabbits and turkeys did not work on dogs. As a result of these failures a number of eighteenth-century scientists may have come to the conclusion that the dog could not be inoculated artificially for rabies, thus the disease must occur spontaneously in these creatures. What is remarkable about this conclusion is that it is based on what was for the time excellent experimental procedure, a practice, like autopsies, that was beginning to change the attitudes about rabies in the eighteenth century.

¹⁰⁸ William Clift, "Lectures on The Principles and Practice of Surgery by John Hunter, 2 vol., undated" Ms, Lectures XII & XIII, Library, Royal College of Surgeons, London.

¹⁰⁹ M. Stacey, "Notes from Hunter's Lectures, 5 vol., 1787" Ms, Lecture # 13, Library, Royal College of Surgeons, London .

¹¹⁰ An examination of the numerous manuscripts of William Hunter's anatomical lectures indicate that, except for occasional anatomical research, William engaged in little or no active experimentation. There are references, though, that John Hunter was, almost from the beginning of his working with his brother William, actively engaged in research--there are a number of references in William's lectures to John's experiments. See : William Hunter, "Lectures on Anatomy, 1750s(?)", Ms., p. 85, Library, Royal Society of Medicine, London.

CHAPTER 4: THE DIAGNOSIS OF RABIES IN THE EIGHTEENTH CENTURY: DOMESTIC CARNIVORES

The first important factor in dealing with rabies in domestic carnivores is obtaining an accurate diagnosis. The present diagnostic technique involves detecting the presence of viral inclusion bodies in the brains of rabid animals. Known as Negri bodies, they were named for the Italian pathologist who first discovered them in 1904.¹ In the eighteenth century the means and methods of diagnosis for dogs and cats fell into three categories : diagnostic tests, evidence from post mortems, and symptoms of the disease itself. Of the three symptomology was probably the most accurate. Even so diagnosis was fraught with pitfalls of vagueness and ambiguities.

One diagnostic test, thought to be sure-fire, involved applying a poultice of bruised walnuts to the bite wound and feeding it to a fowl. If the animal which caused the wound was mad the fowl would die in a day or two.² A second involved soaking up blood from the bite wound with a piece of bread and offering it to a dog. If the animal that created the wound was mad the dog would not eat the bread. A variant involved rubbing the gums, mouth and nose of a suspected mad dog with bread and offering it to dogs or to fowl. Refusal by the dog or the death of the fowl, were seen if the animal was mad.³

It was generally accepted that these tests were infallible. This belief may have been supported by both experimental results and clinical case reports. The scientific literature noted that a number of scientists who attempted artificially to create this disease in animals used fowl as experimental animals, sometimes with positive results. More intriguing is the clinical case

¹ Negri initially believed these bodies were protozoans and as such the causative organism for rabies. See: V. A. Moore and C. Way, " A Rapid Method for The Diagnosis of Rabies," American Veterinary Review 28 (1904-5): 658-662; C. Way, "The Negri Bodies and The Diagnosis of Rabies," American Veterinary Review 29 (1905-6): 937-942; John Blaisdell, " Louis Pasteur, Alexandre Lioutard and The Riverdale Dog Case," Veterinary Heritage 15 (1992): 11, 15.

² Layard, 19-20.

³ Layard, 20; Hamilton, 152; M. Petit, " A Certain Method of Knowing Whether A Dog, when He Hath Bit A Person, Be Really Mad," Gentlemans Magazine 30 (1760): 288.

that involved two dogs and a piece of meat. According to one source in 1751 a dog, which was sullen and frothing at the mouth was suspected of being rabid. As a sort of test the animal was offered some chopped meat but was unable to swallow it and thus dropped it, covered with froth and saliva. He died one day later. Another dog came by and ate the meat the first dog had left ; this animal died, slaving and mad, two weeks later.⁴ These tests were extremely popular. Their degree of popularity is best reflected by their duration of survival. Tests like this are first seen in Anglo-Saxon medical literature ; they survive right up to the time of Pasteur.⁵

The second diagnostic method, post-mortem results, were not always accepted as conclusive. In the eighteenth century post-mortems on dogs who died of rabies were very rare. Moreover, results were generally inconclusive. Benjamin Rush noted the dissection of a dog that supposedly died of rabies. "exhibited all the usual marks of inflammation and effusion which takes place in common malignant fevers."⁶ Necropsies on animals did lead one scientist, Pierre DeSault, to conclude the disease in dogs was due to the presence of worms in their heads. He noted that earlier scientists had found worms in the heads of mad horses, sheep and oxen.⁷ A number of earlier works noted that after a shepherd's dog went mad the animal's cranium was opened and an infinite number of worms were found. The old shepherd referred to these as 'mad worms' or worms that cause madness by biting at the brains of animals. DeSault believed the worms entered the body through the saliva of other mad animals.

We may persuade ourselves that the poison of hydrophobia consists in these little worms, the same insects seen swimming in the saliva of mad creatures, and which are found in the brain. These worms penetrate into the blood and when they become a certain number they attack the brain, throat and salival glands.⁸

⁴ Christian Nugent, An Essay on The Hydrophobia (London: J. Leake and W. Frederic, 1753), 2.

⁵ Blaisdell, Hist. Med. Vet., 1991, 39; Anony., "An Old Method of Detecting Rabies," Medical Record 22 (1884): 92; Blaisdell, 1992, 3.

⁶ Rush, v. 2, 312-3.

⁷ He all but made this an academic argument for equids when he earlier noted that Horses, Mules, Asses were not susceptible of the passion. DeSault, 205, 206.

⁸ DeSault, 209.

Other authors recognized the 'worms' for what they were, parasitic infestations that caused neurological problems in the animals they attacked⁹.

The third, and main, method of determining rabies in a suspected animal was identification of the symptoms. Because of its importance there were extensive discussions of symptomology in both humans and animals, discussions that were often reinforced with detailed clinical descriptions of rabies. Diagnosis by symptoms, though, was anything but foolproof, a conclusion arrived at by more than a few scholars and scientists.

Clinical descriptions appeared in all forms, including poetry. A poet named Somerville provided descriptions of both dumb and furious rabies:

When Sirius reigns, and the sun's parding beams
 Bake the dry gaping surface, visit thou
 Every ev'n and morn, with quick observant eye,
 Thy panting pack. If, in dark sullen mood,
 The gloating hound refuse his wonted meal,
 Retiring to some close, obscure retreat,
 Gloomy, disconsolate ; with speed remove
 The poor infectious wretch, and in strong chains
 Bind him suspected. This that dire disease
 Which art can't cure, wise caution may prevent,
 But, this neglected, soon expect a change,
 A dismal change, confusion, frenzy, death.
 Or in some dark recess the senseless brute
 Sits sadly pining; deep melancholy,
 And black despair, upon his clouded brow.
 Hang lowering, from his half-opening jaws
 The clammy venom, and infectious froth,
 Distilling fall ; and from his lungs inflamed
 Malignant vapours taint the ambient air,
 Breathing perdition ; his dim eyes are glazed,
 He droops his pensive head, his trembling limbs
 No more support his weight ; adject he lies,

⁹ William Moorcroft, "Case of A Cyst containing Hydatids, Extracted from The Right Anterior Ventricle of The Brain of A Cow," Medical Facts and Observations 3 (1792): 17-33.

Dumb, spiritless, benumbed ; till death at least
 Gracious attends, and kindly brings relief.¹⁰

Somerville includes with his comments on furious rabies a somewhat abbreviated description of rabies in a horse.¹¹

All poetry aside, it generally held that the earliest symptom of rabies was loss of appetite.¹² One author noted: "The first symptom of canine madness is failure of appetite. The dog does not eat his usual food with his usual eagerness, though if better food be offered to him he may eat greedily."¹³ Another author observed the loss of appetite was due not to increased particularity with respect to food but rather to an inability to swallow. "Although he (the dog) is hungry or thirsty, he takes no food or drink, having lost the process of deglutition, especially of fluids."¹⁴ This observation ran contrary to the belief that fear of water was not a symptom seen in dogs.

When these authorities are examined more closely 'fear of water' becomes a qualified observation. One author noted that in dogs there was no fear of water though there was an inability to swallow.

Though mad dogs generally refuse both food and drink in the latter stage of the disorder; yet they never show any abhorrence or dread of water; will pass through it without difficulty and lap it eagerly to the last. But it is remarkable that though they will lap water for a long time. . . yet they do not appear to swallow a single drop of it for however long they lap it no diminution of the quantity can be perceived.¹⁵

Another individual believed the inability to swallow fluids was not affected. He observed an animal who continued to drink water right up until the night before his death. While this animal could drink fluids he appears to have had trouble with solid food ; when meat was given to him he did not eat but rather attempted to hide it under the straw.¹⁶ Another author observed that lack of appetite was more a reflection of personality change. "The first symptoms (in a dog) is a disinclination for his food ; he does not refuse it but takes it with an

¹⁰ Sportsman's Cabinet, 303-4.

¹¹ Sportsman's Cabinet, 305-6.

¹² Berkenhout, 9; Barry, 21; Sportsman's Cabinet, 302.

¹³ Arnold, 217.

¹⁴ Anony., An Essay on The Bite of A Mad Dog, (London: Privately Printed, 1767), 4.

¹⁵ Arnold, 221-223.

¹⁶ Babington, 152-3.

evident indifference and listlessness."¹⁷ In a clinical case involving a Newfoundland /Mastiff cross in the late stages of the disease when water was placed in front of the animal she would take a sip or two and then stop. It was further observed that when she tried to eat solid food she would immediately regurgitate it.¹⁸ Clearly, there was no agreement on this supposed symptom.

Of all the symptoms, personality change was the one that was most often agreed upon. For some authorities personality change meant depression, for others it meant a heightened sense of aggressiveness. One author observed that this disease was often accompanied by a state of melancholy. "In health he (the dog) is frolicsome and playful; but now he hangs his tail, and, at the approach of his master, or any other members of the family, shows none of the joy with which he was wont to welcome at their return home."¹⁹ Another work observed the affected animal became solitary and was constantly endeavoring to hide himself in holes or corners, as if to withdraw from family observation.²⁰ This was repeated by at least one other work.²¹ An additional work noted: "When a dog is seized with this disorder. . . he does not frisk about, he is not fond of, nor does fawn upon anyone. . . but appears sick."²² At least one other source noted this same melancholy attitude.²³ An additional work observed an obliviousness or lack of concern in these animals for their own welfare. "A mad dog will not cry out on being struck or show any sign of fear on being threatened, though he will very late in the disease appear sensible to kind treatment."²⁴ In a clinical case it was observed that while the appearance of the animal was 'downcast and sullen' the animal herself was extremely restless, constantly getting up and lying down.²⁵

This restlessness was but one reflection of a change in the creature's personality. It was observed in some animals that a heightened aggressiveness occurred after the initial symptoms.

¹⁷ Hamilton, 4.

¹⁸ M. Norris, "Case of The Bite of A Mad Dog," Memoirs of The Medical Society of London 5 (1799): 306.

¹⁹ Hamilton, 4.

²⁰ Sportsman's Cabinet, 302.

²¹ Barry, 20.

²² Anony., Essay, 4.

²³ Berkenhout, 9.

²⁴ Arnold, 217.

²⁵ Norris, 303.

One author observed the animal in time became agitated, snapped at every other animal and within 48 hours died in convulsions.²⁶ Another author noted that at this stage of the disease there was a tendency to fight and quarrel with other dogs. "A mad dog, in the height of the disorder, has a disposition to bite all other dogs, animals and men. When not provoked he usually attacks those such as come in his way."²⁷ This aggressiveness was often exhibited in the form of a heightened defensive posture; one author observed that while mad dogs attacked strangers they generally respected their masters.²⁸ Many of the sources strongly correlated increased aggressiveness with heightened infectiousness.²⁹

Behavioral change also provided a contrast of clinical rabies in dogs versus cats. One author noted while a dog in the early stages exhibited only a heightened defensive posture a cat showed a much more violent temperment: "A mad cat seizes and enters into a conflict with every object which it attacks; they spring with great violence and fasten teeth and claws on the object."³⁰ This description coincides very closely with the case of a rabid cat which fastened onto a gentleman's leg and remained there until she was forcibly removed. The animal later attacked the same individual, as well as his assistant, with the same degree of tenacity. So furious was the creature that it was necessary to kill her to stop her attacks.³¹

It was during this stage of heightened aggressiveness that other dogs became capable of recognizing the inherent danger to themselves. One individual wrote: "All dogs are alarmed and evidently agitated at the approach of one in this state. . . and upon scenting him, not only instantly avoid him, but fly from him with the utmost speed and horror."³² A second author believed avoidance behavior by other dogs was a sure sign that the suspected animal was rabid.³³ A third author, though, saw in avoidance behavior as a sign of divine intervention.

²⁶ Berkenhout, 9.

²⁷ Arnold, 217, 219, 220.

²⁸ Barry, 21.

²⁹ Sportsman's Cabinet, 302 ; Arnold, 220.

³⁰ Moseley, 40.

³¹ Moseley, 56-58.

³² Sportsman's Cabinet, 303.

³³ Robert James, A New Method of Preventing and Curing Madness Caused by The Bite of A Mad Dog, 2nd ed. (London: T.Osborne, 1743), 36.

For a day or more he (the mad dog) shuns other dogs and is equally shunned by them. Lo ! here, the wisdom of the creator has endowed these animals with an instinctive knowledge for their own preservation.³⁴

Changed behavior was not the only sign of rabies ; the animals' physical appearance and even their voice changed. An animal in the throes of this disease exhibited inflamed eyes, drooping ears and tail and a particular howl.³⁵ One author observed: "Mad dogs never bark, but occasionally utter a most dismal and plaintive howl, expressive of extreme distress."³⁶ Another scientist noted that mad dogs emit a howl which those who have heard it can never forget.³⁷ Still a third work observed: " The tone of the mad dog's voice. . . constitutes a kind of imperfect bark, both hoarse and hollow."³⁸ Lastly, a scientist held that the change in the animal's voice was the first sure sign that the creature was actually mad.³⁹

Another source of debate was the condition of the mad dog's eyes. Some authors believed in mad dogs the eyes became inflamed, others noted they 'lost their lustre'. One author noted: "The eyes of mad dogs do not look red or fierce; but dull and have a peculiar appearance."⁴⁰ Another author observed that mad dog's eyes appeared mixed and less clear than formerly.⁴¹ Still others noted the eyes of mad dogs appeared dispirited, dull, and full of tears⁴². But other authors believed the dogs' eyes became anything but dull; it was noted by at least one scholar that the animal's eyes appeared inflamed and his looks wild and furious.⁴³

Another debatable symptom was the degree to which the animal foamed at the mouth. Some scientists said it occurred excessively, others not at all. One author attempted to provide a physiological explanation for excessive salivation. The mad dog's lungs were disordered by the circulation of envenomed blood; his fauces, with acrid, poisoned saliva and mucus, and the larynx inflamed or spasmodically contracted; he breathes quick, and with difficulty. To relieve

³⁴ Hamilton, 5.

³⁵ Anony., Essay, 4; Berkenhout, 9; Barry, 21; Arnold, 229.

³⁶ Arnold, 220.

³⁷ Fothergill, 177.

³⁸ Sportsman's Cabinet, 303.

³⁹ James, 36.

⁴⁰ Arnold, 220.

⁴¹ Hamilton, 4.

⁴² Barry, 21 ; Sportsman's Cabinet, 302 .

⁴³ Essay , 4.

these conditions he opens his mouth and puts forth his tongue which is covered with a yellow, frothy matter.⁴⁴ Another author observed that not all mad dogs foam at the mouth; in some the lips and tongue appear dry and discolored.⁴⁵

This apparent contradiction might be explained by the writings of another author. He noted frothing at the mouth depended upon the type of rabies seen. There were two types of madness seen in dogs: furious madness and dumb madness. In furious madness the jaw is closed and there is an absence of moisture around the mouth. Animals in this last stage exhibit the symptoms similar to lockjaw.⁴⁶ In dumb madness the jaw drops open and remains so, the tongue, which is leaden-colored, hangs out of the mouth and the animal salivates excessively. It was the presence or absence of paralysis in the jaw which determined whether the mad dog frothed at the mouth.⁴⁷ In the records of specific cases in dogs it was noted that a number of the animals salivated excessively. In one case a dog, who in 1751 bit a woman named Elizabeth Bryant, was described as 'sullen and frothing at the mouth'⁴⁸ while in another it was observed that just before the dog died a discharge of slimy matter exuded from her nostrils and her mouth appeared foamy.⁴⁹

The last stages of rabies involved confusion, disorientation, incoordination and eventually paralysis. The dogs grew faint and weak, often fell down and then rose up and attempted to fly at everything in their paths. This stage seldom continues more than thirty hours before death puts an end to the creature's suffering.⁵⁰ It was generally agreed that at this stage the afflicted animal becomes delusional and no longer recognizes anyone; he now snaps at everyone and everything that comes his way. One work noted: "He [the dog] starts and barks at his own shadow ; and wandering about, not knowing where, he snaps at, or flies furiously upon anyone he meets."⁵¹ Others noted the animals at this stage walked nodding, as if overpowered with sleep.⁵²

⁴⁴ Anony., Essay, 4.

⁴⁵ Fothergill, 163, 177.

⁴⁶ Arnold, 223.

⁴⁷ Arnold, 229, 235.

⁴⁸ Nugent, 2.

⁴⁹ Norris, 304.

⁵⁰ Barry, 21 ; Sportsman's Cabinet, 302.

⁵¹ Essay, 4.

⁵² Barry , 21 ; Sportsman's Cabinet, 302.

For all their detailed discussions of the symptomology a number of authors held this evaluation was anything but foolproof with respect to a confirmatory diagnosis. One author noted: "It should, however, be remembered that madness is not the only distemper which dogs are liable. Many have, no doubt, been called mad, that were affected with other diseases."⁵³

Another author observed:

A favorite dog, in the first stage of the disease, betrays no mark of contagion; nor is he suspected till he has bitten one or more persons. . . and afterwards died raving. On the other hand, many a harmless dog, that happens to be ill of some other complaint is hastily pronounced mad, and falls a victim to unjust suspicion.⁵⁴

The situation was further complicated by the definition of the disease itself. At least one scientist saw hydrophobia as a symptom and not a disease.

That distemper which in dogs and other animals is called madness I look upon to be nothing more than a fever, to which carnivorous brutes are particularly subject, and of which hydrophobia is a symptom. Now when this distemper is inoculated into other animals it does not appear that the same symptoms should appear in the animals it is inoculated into, as in the animal it was inoculated from.⁵⁵

All these problems led some scientists to advocate what was, and to some extent still is, one of the most accurate diagnostic tests for rabies--isolate the suspected animal until he dies from the disease. One scientist noted that careful observation was important for an accurate diagnosis.

I judged it the more necessary to give this account of the manner of the dog, as well as of the symptoms she labored under. . . because such an opportunity, I believe, rarely occurs: a poor dog, that has the character of being mad, is either quickly destroyed, or else is so frightened by being hunted, pelted, and worried, that the genuine undisturbed progress of the disease cannot often be ascertained.⁵⁶

Another author suggested that if in the early stage the suspected animal were tied up not only would that eliminate the chance of his biting humans and other animals but would provide a definite determination as to whether the animal had the disease. He further concluded that the

⁵³ Hamilton, 145.

⁵⁴ Fothergill, 163.

⁵⁵ James, 37.

⁵⁶ Norris, 304-5.

process of restraint was a far more effective test for the disease than the old bread-crumbs-on-the-gums-technique.⁵⁷

If the animal be killed, the truth can never be ascertained; and should persons be bit by him, their apprehensions must continue ; whereby they must feel all the horrors of their supposed dangerous situation, and all anxiety that doubt can create.

But should (the dog) be instantly tied up till time had ascertained his real state, either their fears would be removed, or the danger they stood in demonstrated whereby they might have it in their power to use such precautions as may be judged most proper and expedient in their circumstances.⁵⁸

Diagnosis of this disease was often complicated by a far more insidious condition: hysteria. One author wrote: "Many a dog is hunted down, and falls a martyr to the blind zeal of the injudicious populace, and the hue and cry raised by ignorance and precipitate outrage."⁵⁹ A second author went into some detail to illustrate exactly how this occurred.

Let it be supposed that a dog loses his master--he naturally exerts his utmost speed, strength, and sagacity, in an anxious and eager hope of recovering the utmost gem of his existence. In this career, eager in pursuit, panting with hope and anxious in fear, wanton boys throw stones, sticks and hallow other dogs to overtake and worry him; . . . butchers, laborers, blackguards and their whole fraternity join in the inhuman hunt. "Mad dog" is exclaimed from every mouth, both brutes and beasts being determined upon his destruction. The poor persecuted victim, finding a host of fiends at his heels; . . . looks wild of course and lolls out his tongue as he continues his course in a fruitless hope of escape; and thus most unmercifully pursued, and taking everyone in his way for an enemy, he naturally attempts to snap at every person he meets in his own defense. The dog in this unfortunate dilemma is not long before he is destroyed, and it is triumphantly declared that he was a mad dog and it is thus rendered impossible to prove the contrary.⁶⁰

⁵⁷ Hamilton, 6.

⁵⁸ Hamilton, 153.

⁵⁹ Hamilton, 152.

⁶⁰ Sportsman's Cabinet, 303-304.

This hysteria may affect the ability accurately to diagnose this disease. It was observed that when the disease occurs in a kennel of hounds the sense of fear and confusion 'absolutely beggar description'.⁶¹

Rabies in a dog was probably one of the most overdiagnosed diseases in the eighteenth century. Everything from epilepsy to just plain antisocial behavior was mistaken for it. A number of diseases seem to have been responsible for the often excessively overzealous concern over rabies in both England and North America. The first, distemper, was in the eighteenth century new to England. What may have been one of the first outbreaks of this disease was seen in 1732 in a kennel of foxhounds. According to one source no less than thirty of these animals died of a disease referred to as 'a madness'. For this to have been rabies all of the thirty affected animals would have to have been bitten at one time or another. While dogs are prone to engage in an occasional brawl that much snarling, growling and biting would not go unnoticed by the kennel keeper. The symptoms of this outbreak: change in appearance of coat and tail, change in tone of bark, a constant frothy discharge from the mouth, lack of interest in eating and drinking, and a change in general temperment, sound very much like those seen with rabies.⁶² The problem is they also sound like the symptoms seen with distemper.

This disease was first documented in England in the 1750s; initially it attacked all ages of dogs. As the disease became more established in the 1780s and 1790s the affected population changed. Now the animals most susceptible were the juveniles. Such a change in demographics is not unusual, especially in the eighteenth century. It has been well documented that diseases, such as smallpox, measles and even diphtheria, after a series of initial outbreaks among the general population confined themselves generally to the juvenile populace; this was because within a short time this was the only susceptible populace left for such highly infectious diseases.⁶³ It was observed that as the incidence of distemper increased the incidence of canine madness declined.⁶⁴ Again, this is evidence that the disease was on more than a few occasions mistaken for rabies. On the continent the disease may have been around

⁶¹ Sportsman's Cabinet, 302.

⁶² James, 7.

⁶³ MacNeil, 51-52

⁶⁴ Sportsman's Cabinet, 281.

since the late seventeenth century; there are documented outbreaks of disease in 1690, 1713 and 1730 that sound remarkably like distemper.⁶⁵

An outbreak in England in 1760 took two forms. The first was characterized by a violent throat infection with a high fever. There was also lethargy, a discharge from the nostrils and abrupt changes in personality--according to one source the dogs seized and bit at their straw beds as if they were mad. Later epilepsy, paralysis of the hind limbs and eventually a convulsive death were observed. One author noted: "Their (the dog's) heads seemed so heavy that they could scarcely carry them, they lost their ability to move and were unable to raise themselves on their straw."⁶⁶ An additional source noted incoordination, fever, loss of appetite and a bleeding from the nostrils.⁶⁷ In a 1783 outbreak animals exhibited runny eyes, paralysis of the hind legs; most of those affected eventually died.⁶⁸

In North America the first documented appearance of distemper was among cats in New York and Philadelphia in 1796-7. The disease was characterized by loss of appetite, excessive thirst, and lethargy. Later, some of the animals entered into a kind of stupor, others became mad and began to foam at the mouth. The reputed therapeutics for this disease were, well into the nineteenth century, almost identical to those for rabies.⁶⁹

As the symptoms of distemper were very similar to those of rabies, this disease was often mistaken for the latter. One of the earliest studies on this disease, by Edward Jenner, was due to a case of mistaken identity of disease in a kennel of foxhounds. Jenner noted with respect to distemper:

My situation in the country favouring my wishes to make some observations on this singular malady, I availed myself of it during several successive years, among a large number of fox hounds belonging to the Earl of Berkeley; and from observing how frequently it had been confounded with hydrophobia, I am induced to lay the result of my inquiries before the Medical and Chirurgical Society.

⁶⁵ Fleming, 1871, vol. 1, 162-3, 190, 197.

⁶⁶ Fleming, 1871, vol. 1, 410.

⁶⁷ Charles Creighton, A History of Epidemics in Britain, 2 vols. (Cambridge: Cambridge University Press, 1891), vol. 1, 354.

⁶⁸ Creighton, vol. 1, 371.

⁶⁹ Anony., "On The Management of Horses and Dogs," American Farmer V (May 23, 1823): 69.

Jenner noted some forty-five years before a gentleman destroyed a large number of hounds, believing them to be mad, when in fact they were suffering from distemper.⁷⁰ Even he had to admit the disease could be easily confused with rabies. He noted symptoms were not absolute but rather depended how severe the condition was: "In this (disease), as in the diseases of the human body, there is every gradation in its violence."⁷¹

The news was not all bad. Jenner noted at least two positive aspects of this disease: first, once the animal has gone through it, he very rarely suffers a second attack, and second, the disease is not communicable to man. Jenner noted, though, that certain individuals bitten by animals suffering from distemper are: "sometimes thrown into such perturbation, that hydrophobic symptoms have actually arisen from the workings of the imagination." He observed that the only real differences in symptoms between hydrophobia and distemper are the conditions of the animal's eyes and their affinity to water. "In hydrophobia, the eye of the dog has more than ordinary vivacity in it and, as the term implies, he refuses to take water, and shudders even at the sight of it, while in the distemper he looks dull and stupid, is always seeking after water, and (is) never satisfied with what he drinks. . . ."⁷² Jenner also noted he had never seen an actual clinical case of rabies so this differentiation was largely based on hearsay.

Far more curious and complicated was the diagnosis of rabies in colonial New England. Recent evidence strongly suggests that a widespread outbreak of rabies in New England in the eighteenth century was at least partially caused by an outbreak of a as yet undetermined disease (or diseases) produced symptoms in dogs and livestock very similar to those of rabies. This outbreak occurred in New England in the fall of 1769. At this time notices were seen in the local newspapers warning of mad dogs; one notice mentioned an ox bitten by one of these dogs who six weeks later died raving mad.⁷³ The same notice also referred to swine and other dogs being bitten and that all the swine died mad. The main victims from this outbreak appear to have been livestock; this article noted some thirty swine, two cows and eight geese had died as a result of this disease.⁷⁴ The outbreak was seen as far north as New

⁷⁰ Edward Jenner, "Observations on The Distemper in Dogs," Medico-Chirurgical Transactions 1 (1809): 265.

⁷¹ Jenner, 268.

⁷² Jenner, 269-70.

⁷³ Connecticut Courant (Hartford) 13 November 1769.

⁷⁴ New London Gazette (New London, Connecticut) 17 November 1769.

Hampshire where it was reported that considerable damage had been done to cattle and swine.⁷⁵

Typical of these cases was a cow, belonging to one John Wright, who was bitten by a dog. Very quickly the animal developed the symptoms of madness: bellowing, a lolling of the tongue and an aversion to food and water. Eventually the animal became raging mad and was destroyed. There is a most curious appendix to this case-it was said that a dog after licking up the blood of this cow instantly went mad.⁷⁶ The towns of Weathersfield, Farmington and Simsbury also confined or destroyed all their dogs after a number showed signs of the disease. In many cases, though, the towns did not move fast enough to prevent the loss of numerous livestock.⁷⁷ In Warren, Connecticut, for instance, one dog was supposedly responsible for the infection of at least sixteen sheep.⁷⁸ By the end of March the epidemic had largely dissipated.

Rabies was probably endemic to New England at this time. The reservoir population for this disease was probably wild carnivores. Fleming noted that in 1771 rabies was prevalent among not only dogs but also foxes.⁷⁹ Probably there was an outbreak of rabies in New England in the fall and winter of 1769-70 which may have originated from rabid feral carnivores: foxes, raccoons, and/or skunks. The occurrence of rabies, though, does not explain the numerous deaths of cattle, sheep and swine. This, plus the other inconsistencies mentioned, seems to suggest some other affliction was occurring at this time. During the outbreak of 1770 one dog was credited with biting sixteen sheep while another canine was held responsible for the deaths of twenty cattle and a number of swine.⁸⁰ If all of these supposed cases in cattle or swine were caused by one dog then the animal was not only rabid but also highly ambitious. There were earlier documented cases of one dog attacking and biting numerous other dogs--in fact it was just these types of attacks that provided a foundation

⁷⁵ New London Gazette (New London, Connecticut) 22 December 1769.

⁷⁶ New London Gazette (New London, Connecticut) 9 February 1770; Boston Chronicle (Boston) 12 March 1770; Connecticut Journal (Hartford) 2 March 1770.

⁷⁷ Connecticut Courant (Hartford) 19 February 1770; Boston Chronicle (Boston) 2 March 1770.

⁷⁸ Boston Chronicle (Boston) 12-15 March 1770; New London Gazette (New London, Connecticut) 30 March 1770.

⁷⁹ Fleming, 1871, vol. 1, 442.

⁸⁰ New London Gazette (New London, Connecticut) 17 November 1769; 30 March 1770.

for the success of Dr. Mead's powders. Without exception all of these animals were confined to kennels.

Livestock in colonial New England were not confined in pens but were fairly free to graze where they wished. The early laws of these colonies recognized the legality of allowing cattle, sheep and swine to wander throughout the common fields and woods if they were marked and/or branded by their owners.⁸¹ Thus the chance of a rabid dog getting more than one cow or pig is fairly remote ; more likely whatever killed all these animals was introduced by the livestock themselves and not by outside carnivores. In at least two cases the exact nature of the disease and the manner of its spread is brought into question. The first case, seen in 1771, involved an outbreak of madness in New Haven, Connecticut. The scenario was very similar to those cases seen in 1770--a mad dog ran through the town attacking cattle, swine and other dogs. Within ten to twelve days all the affected animals exhibited many of the symptoms of madness. The only problem was when the animals were examined many showed *no evidence of bite wounds*.⁸² If the animals were infected without being bitten then was the disease actually rabies or something, more easily spread, that resembled rabies?

The misdiagnosis of rabies appears to be as old as the practice of veterinary medicine. One of the first examples of this is seen in the writings of a late Roman veterinary author Vegetius.⁸³ in his work on the diseases of horses he notes under the heading "Madness":

But if at the same time a distemper of the breast shall seize a horse that has the staggers, it presently makes him furious or mad ; for from the too great heat of the liver--there arises so violent a pain of the place itself, *that he bites and eats himself* [italics mine].⁸⁴

There is from the early seventeenth century a discussion of madness in horses that also appears to be pseudorabies. The author, Gervase Markham, goes into great detail about the

⁸¹ John Cushing, ed., The Earliest Laws of The New Haven and Connecticut Colonies (Wilmington, Delaware: Michael Glazer, 1977) 22, 47, 131, 132.

⁸² Massachusetts Spy (Boston) 7 March 1771; Boston Evening Post (Boston) 11 March 1771.

⁸³ For a biographical outline of this author see: Smith, vol. 1, 20-30; J. F. Smithcors, Evolution of The Veterinary Art (Kansas City: Veterinary Medicine Publishing Co, 1957), 103-109.

⁸⁴ Vegetti Renati, Artis, Veterinariae sive Mulomedicinae (Basileae: J.Faber, 1528) 24.

affliction of madness in horses. He notes that there are four kinds of madness, all brought on, according to him, by pathological changes in the blood. Under the fourth madness he notes:

The fourth and last is, when that blood infecteth not only the brain and heart but even the pannicle also, and then is he said to be stark mad, which you shall know by his biting every man which comes neere him, by his knowing the manager and walles about him and lastly by *tearing his own skin to peeeces*.⁸⁵ [Italics mine]

There is also a reference from the work of Michael Harward, a late seventeenth-century Irish veterinary practitioner. Harward notes in his writings that he originally came from Cheshire. How he came eventually to practice in Ireland he does not explain; it is evident from his writings he was practicing there sometime after 1652. More important, Harward was also the author of a work on veterinary medicine, entitled The Herdsman's Mate, which is considered to be progressive for its time.⁸⁶ There is a reference to a case which appears to be a mistaken diagnosis of rabies.

In August 1663, I had a young oxe began to be mad, being bitten, As I thought, but how long before I know not, neither found any hurt on his body; however, the signs of being mad by the biting of a mad dog, were evidence enough that it was so ; for he began to roar, and scrape on the earth, run at quitisbanks [?], fight with his fellows and would neither eat nor drink.

The author noted that despite these rather dramatic symptoms the animal still recovered.⁸⁷

Secondly, there are throughout the veterinary literature of the sixteenth, seventeenth and eighteenth centuries numerous references to swine suffering from rabies. In some cases the incidence of this disease is so frequent that some veterinary writers set aside separate section in their works discussing the treatment of swine who were supposedly bitten by mad dogs.⁸⁸ In most cases the swine, when they become sick, become sick in large numbers. This suggests that some other means than the bite of a rabid animal may be spreading the disease. Since the

⁸⁵ Gervase Markham, Markham's Maisterpeece (London: N.Okes, 1610), 63.

⁸⁶ Smith, vol. 1, 323-324 ; Smithcors, 204.

⁸⁷ Michael Harward, The Herdsman's Mate (Dublin: Benjamin Tooke, 1672), 119.

⁸⁸ Leonard Mascall, The First Booke of Cattel (London: J. Wolfe, 1587), 26, 286;
Leonard Mascall, The Government of Cattell (London: F.R.Jackson, 1619), 26, 281;
Gervase Markham, Cheape and Good Husbandry (London: F.R. Jackson, 1616), 94;
Joseph Dalby, The Virtues of Cinnabar and Musk Against The Bite of A Mad Dog
(Birmingham: J.Baskerville, 1762), 8-10, 14.

animals exhibit symptoms similar to rabies it was believed that the affliction is just that. In some instances, however, it is very evident that the swine were effected by something other than rabies. One late eighteenth-century work provides a whole section on treating madness in swine. The author, though, appears less than convinced that this is the same disease seen in mad dogs.

The signs of madness in hogs,. . . are nearly the same ; viz, an hog, on this occasion, will paw with his feet, foam at his mouth and champ or gnash with his jaws, start suddenly, and jump upon all four at intervals. Some of the country people have mistaken this distemper for the fever in swine; others have mistaken it for the staggers ; but in neither of these do the swine paw with their feet, the venomous bites alone giving them that direction. . . .⁸⁹

In the earlier centuries, the disease in swine would have been blamed on witchcraft. Probably the first reference to this is found in Laws of Kenneth II who in the ninth-century was king of Scotland. It is noted that if a sow acts in a mad manner the creature is to be stoned to death and her flesh is not to be consumed.⁹⁰ This is further reflected in the case from sixteenth-century Southampton; a tanner named William Hoppgood complained to the local magistrate that one of his neighbors, a lady known as Widow Wells, had bewitched his pigs. According to him five of his young pigs 'danced and lipped in a most strange sort (as if they had been bewitched). Moreover, all of these animals died in a space of 2 hours.⁹¹

Witchcraft was also blamed for a disease reoccured on a regular basis in seventeenth century Massachusetts and Connecticut. The earliest example of witchcraft in New England associated with the ill health of animals is seen in a witch case in Connecticut in 1648. During the trial of Mary Johnson it was noted that her close relationship with the devil allowed her to make hogs run around in a 'frenzy.' Some five years later Elizabeth Goodman was also put on trial for witchcraft. Again the evidence involved sick animals. According to one of the

⁸⁹ Henry Bracken, Taplin Improved or A Complete Treatise on The Art of Farriery (New York: Francis Adancourt, 1815), 195.

⁹⁰ Holinshed's Chronicles of England, Scotland and Ireland, 6 vol. (New York: AMS Press, Inc., 1965), vol. 5, 207.

⁹¹ G. H. Hamilton and E. R. Aubery, ed., "Books of Examinations and Depositions 1570-94", Southampton Record Society (1914) 158-159.

witnesses, Allen Ball, Mrs. Goodman, after being treated badly by his wife, caused all but one of his pigs to die.⁹²

In 1659 there records of the sick animals that were supposedly bewitched by John Godfrey of Newbury, Massachusetts. The depositions against Godfrey mention sickness and death of livestock. One notes: "the swine was taken sick with afoaming and roling and turned round and did dye."⁹³ Another deposition notes Godfrey supposedly patting a calf on its back and the animal within a day dying of unknown causes.⁹⁴ These records suggest a disease, whatever it was, that affected both swine and cattle. Its progress was an extremely acute one in some animals, particularly cattle, and of a more chronic nature in others, such as swine.

Some twenty years later a similar affliction led to an accusation of witchcraft against Elizabeth Morse, also of Newbury, Massachusetts. Of the numerous depositions filed against Elizabeth Morse five contain notations of sick, dying or dead livestock--in all, there are fifteen cases of sick or dead animals. One noted a very lethargic mare; the animal refused to work, even move, when in harness. A second noted three calves "dancing and rowding" in a barn. At least one calf showed a reoccurrence of this behavior ; this time not only dancing and running about but also roaring (bellowing) and exhibiting 'abad moth'. At one point the animal was 'setting upon his tail like a dog'. Later court records recorded this animal continued to have the fits until he died sometime in the spring.⁹⁵

A third deposition noted sick sheep, foaming at the mouth.⁹⁶ A last deposition notes the loss over a number years of livestock in an unusual manner. The first occurrence, some sixteen years before, involved a pig that , though healthy the night before, was found dead in the yard the next morning. The cause of the animal's death was never determined. Later a sheep also died very suddenly of unknown causes. There was also a cow that "was taken in a very strong

⁹² George Lincoln Burr, Narratives of The Witchcraft Cases 1648-1706 (New York: Charles Scribners Sons, 1914), 135-36, 410.

⁹³ Elizabeth Whitaker, Deposition #117 in John Godfrey Witchcraft Case, Suffolk County Archives, no. 322, v. 2, June 1659, Manuscript, Massachusetts Archives.

⁹⁴ Elizabeth Ayres, Deposition in John Godfrey Witchcraft Case, Suffolk County Archives, no. 322, v. 2, June 1659, Manuscript, Massachusetts Archives.

⁹⁵ Samuel G. Drake, Annals Of Witchcraft in New England (New York: Benjamin Blom, 1967), 258-268.

⁹⁶ "Joshua Richardson, Court Deposition, Elizabeth Morse Witchcraft Trial, January 7, 1679" in Drake, Annals, 262-3.

manner."⁹⁷ The last animal seems to have suffered from some form of neurological affliction because it exhibited disorientation and poor muscle coordination. The creature "tumbled over logs that laid in the yard"⁹⁸. Another cow was found dead in the stall. From the condition of this animal it appears she died in convulsions; "she was turned in the stall with her head under her. . . ."⁹⁹ Additionally, there was a cow with a neurological condition: "The animal laid down in a shedy (shaded) place among thorn bushes and would neither eat nor chew her coad (cud) for several days."¹⁰⁰ The last deposition noted a calf exhibiting severe dermatological symptoms with " The hair and skin gone off his back and it was red like a burn, and would never heal but grew worse and worse." Another cow showed an abrasion on her side so severe that "dung ran out of her side."¹⁰¹

Pseudorabies is a disease of livestock caused by a herpes virus. Depending upon the animal affected the symptoms vary. Generally the signs are excessive salivation, fever, depression, severe itching, and convulsions. In swine the severity of the disease can vary widely, from a subclinical infection, with no signs or symptoms, to sudden death.¹⁰² In severe cases, in which the central nervous system is affected, there are muscle spasms, loss of postural control, convulsions and eventually death. Those animals that recover can show blindness and/or partial paralysis. As a rule the disease is much more severe in younger animals than in older ones. Acute pseudorabies in swine almost always involves severe neurological dysfunction.¹⁰³

In other animals, such as cattle and small ruminants, the symptoms involve severe itching. The scratching in these creatures becomes so severe as to resemble self mutilation. This is usually followed by neurological symptoms similar to those seen in swine. It has been observed that cattle occasionally die of pseudorabies without exhibiting skin lesions. In these cases the symptoms seen are neurological in nature : muscle twitching, unusually aggressive

⁹⁷ "Caled Moody, Court Deposition, Elizabeth Morse Witchcraft Trial, January 7, 1679" in Drake, Annals, 263.

⁹⁸ "Caleb Moody" in Drake, Annals, 263.

⁹⁹ "Caleb Moody" in Drake, Annals, 264.

¹⁰⁰ "Caleb Moody" in Drake, Annals, 264.

¹⁰¹ "John Mighell, Court Deposition, Elizabeth Morse Witchcraft Trial, January 7, 1679" in Drake, Annals, 267-8

¹⁰² Diseases of Swine, 5th edition (Ames: Iowa State University Press, 1981), 213.

¹⁰³ Diseases of Swine, 214-5.

behavior characterized by aimless kicking, depression or lethargic behavior, convulsions and death. In cattle recovery from acute pseudorabies is relatively rare.¹⁰⁴ In sheep and goats the symptoms, involving skin lesions, restlessness, shaking of the head, facial contractions, excessive salivation, convulsions and eventually death, are similar to those in cattle. The neurological symptoms are more likely to be seen in animals that exhibited an initial oral infection.¹⁰⁵

The disease was first described in the United States in 1823 when a disease in cattle was observed that was characterized by heavy itching. At this point it was called the 'mad itch'.¹⁰⁶ In 1849 it acquired its first confusion with rabies when a similar disease occurred in Switzerland that was mistaken for rabies because of the similarity of the symptoms in cattle and dogs.¹⁰⁷ This was not the first or last time these two diseases were confused. As late as the late nineteenth century, after a definitive test for rabies had been developed, a number of articles appeared in the veterinary literature examining the confusion of rabies and pseudorabies in dogs and cattle. The articles noted a definite inconsistency in the disease among dogs: in two cases the symptoms were identical to those of rabies, in the first case the animal recovered uneventfully, in the second case it died.¹⁰⁸ Another author believed because of the symptoms there was a connection between pseudorabies and rabies.¹⁰⁹ A last author summed up the relationship between these two diseases when he noted: " This disease as seen in cattle very closely resembles rabies and I doubt not has often been diagnosed as rabies, and for the want of a better term I will designate it as pseudorabies."¹¹⁰ One of the arguments this author gives

¹⁰⁴ Robert F. Kahrs, Viral Diseases of Cattle (Ames: Iowa State University Press, 1981), 198 .

¹⁰⁵ G. Wittman, ed., Herpes Virus Diseases of Cattle, Horses and Pigs (Boston: Kluner Academic Publishers, 1989), 163-4.

¹⁰⁶ "Editorial Correspondence", American Farmer 5 (1823): 245-6.

¹⁰⁷ Wittman, 230.

¹⁰⁸ F. Hendrickx, " Rabies and Pseudorabies in The Dog" , American Veterinary Review 12 (1889): 230-31 ; A. F. Becker, "Pseudo Rabies in A Dog : Postmortem" , American Veterinary Review 14 (1890-91): 550.

¹⁰⁹ M. Van Passen, " Pseudorabies or Eclampsia in Cows," American Veterinary Review 15 (1891-92): 345-6 .

¹¹⁰ G. A. Johnson, " Pseudorabies in Cattle," American Veterinary Review 18 (1894-95): 273.

against it being rabies was the prevalence of the disease among cattle." If these were outbreaks of rabies why was the disease so much more prevalent in cattle than in dogs, as there was seldom more than one or two dogs affected in the neighborhood."¹¹¹

The problem with pseudorabies being the culprit for many of the cases of misdiagnosis, especially those in colonial New England, is that this disease does not affect horses; moreover, in adult pigs the symptoms are usually asymptomatic.¹¹² Additionally, the one symptom which exists with pseudorabies--the presence of skin lesions--is not described in most of the records. Most of the existing descriptions of madness at this time make no mention skin lesions on any of the affected animals. It has been established, though, that not all affected animals develop skin lesions.¹¹³ Moreover, the pruritis often occurs as the result of excessive rubbing and not as a primary skin lesion.¹¹⁴ Thus in cases where rabies was believed to be the cause the skin lesions would have been seen as a result of the madness and given little or no consideration. There is also some confusion with respect to human cases. In one case three modern cases of pseudorabies in humans were reported. This may not have been pseudorabies, but rather another herpes viral infection. No skin lesions were seen, just neurological symptoms closely approximating rabies so the affliction may have been something more akin to a herpes zoster infection.¹¹⁵

Another candidate for the mistaken-as-rabies is listeriosis. Listeriosis is a sporadic bacterial infection characterized by encephalitic symptoms in adult animals and acute septicemia in juvenile animals. Caused by a rod-shaped bacillus *Listeria monocytogenes* the disease is mainly manifested by central nervous system involvement. At the onset the affected animal exhibits solitary behavior. Soon after depression, incoordination and paralysis are seen. In young cattle whirling around while using the hindlegs as a pivot is sometimes observed. Note the case of the dancing calf in the Elizabeth Morse witchcraft case.¹¹⁶ In some cases the neurological involvement causes a twitching of the facial muscles along with marked rigor of the muscles of the neck, head and forelegs. This paralysis often makes swallowing impossible.

¹¹¹ Johnson, 277.

¹¹² O. H. Siegmund, ed. The Merck Veterinary Manual (Rahway, New Jersey: Merck and Co., 1973), 237-8.

¹¹³ Diseases of Swine, 213-4 ; Kahrs, 197-8 ; Wittman, 163-4.

¹¹⁴ Diseases of Swine, 214.

¹¹⁵ Slaoko Mravak, et al., "Pseudorabies in Man," Lancet #8531 (February 1987): 501-2.

¹¹⁶ See footnote # 95.

In small ruminants the course of the disease is fairly rapid and the animals may be dead within 48 hours after the first appearance of the symptoms. In other animals the disease is less acute and the symptoms may last as long as 14 days. Spontaneous recovery can occur though very infrequently. The disease may occur on the same premises over a number of years.¹¹⁷

There is little question but that listeriosis was the culprit in many cases of so-called rabies outbreaks among livestock. The disease itself was only identified as a separate entity in 1926, but there is at least one outbreak of disease in cattle from the late nineteenth century that sounds remarkably like this affliction.¹¹⁸ This plus other factors seems to indicate the disease that was blamed on witchcraft in seventeenth-century New England may have been listeriosis. The only problem with this theory is that listeriosis does not generally affect horses. Only rarely does this disease appear in equids, usually when the affected animal is also suffering from problems of immunodeficiency.¹¹⁹

A third possibility could be a poison, or poisons, that affect the central nervous system. The possibilities here are many and varied. One possibility is lead poisoning. Lead poisoning supposedly contributed to the fall of the Roman Empire. Lead poisoning may also have been a major factor in the high incidence of gout in the eighteenth and nineteenth centuries.¹²⁰ Lead poisoning can be easily confused with rabies—no doubt some of the so-called rabies cases in humans and animals in the eighteenth century were actually neural deterioration from long term exposure to lead. There are some differences though. Lead poisoning often causes clonic spasms and convulsions. Additionally, whereas rabies is an

¹¹⁷ H.E. Amstutz ed., Bovine Medicine and Surgery, 2nd ed., 2 vols. (Santa Barbara, California: American Veterinary Publications, 1980), vol. 1, 252-254; Siegmund, 380-384.

¹¹⁸ E.G.D. Murray, R.A. Webb and M. B. R. Swann, "A Disease of Rabbits Characterized by a Large Mononuclear Leucocytosis, caused by a Hitherto Undescribed Bacillus *Bacterium monocytogenes*," Journal of Pathology and Bacteriology 29 (1926): 407-439; T.B. Newby, "An Unclassified Disease of Cattle," American Veterinary Review 18 (1894-95): 829-831.

¹¹⁹ E.G. Clark, A.S. Turner, B.G. Boysen and B.T. Rouse, "Listeriosis in an Arabian Foul with Combined Immunodeficiency," Journal of The American Veterinary Medical Association 172 (1978): 363-366; R.A. Mansmann and E.S. McAllister ed., Equine Medicine and Surgery, 3rd ed., 2 vols. (Santa Barbara, California: American Veterinary Publications, 1982), vol. 2, 1246.

¹²⁰ Richard P. Wedeen, Poison in The Pot: the Legacy of Lead (Carbondale, Illinois: Southern Illinois University Press, 1984).

acute disease long term exposure to lead can result in chronic health problems. There can be from marked neural deterioration which often results in appendages or limbs becoming permanently weakened or paralyzed. Chronic mental deterioration is also a prominent symptom of lead poisoning.¹²¹

Another good possibility is ryegrass staggers. The exact cause of this condition is not definitely known but many believe it may have something to do with the alkaloids peroline and halostachine that are found in ryegrass.¹²² Much of the original work on this condition was done in the 1940s.¹²³ More recent studies indicate that this condition affects most livestock, including equids. Initially the animals exhibit a stiffened gait; later incoordination and spasmodic behavior is seen. Eventually the animals may exhibit general paralysis-this paralysis may become so severe that the affected creatures may starve to death.

As a rule, though, mortality is very low and if the animals are properly cared for they generally recover completely. The condition will return if the animals are not moved to a different pasture.¹²⁴ Ryegrass staggers is a superb candidate for the disease outbreak in seventeenth-century New England that was blamed on witchcraft. Moreover, any cases where livestock, in spite of exhibiting rabies-like symptoms, recover could very easily be due to ryegrass poisoning. An excellent candidate would be the sick cow treated in 1663 by Michael Harward.¹²⁵

An examination of the written evidence shows that rabies among livestock was a highly overdiagnosed disease. Moreover, this overdiagnosis led to the belief that numerous cases of so-called rabies were treatable-a that did not disappear until the early twentieth century. Clearly, the lack of effective diagnostic techniques for determining rabies in animals led to more than a few cases of mistaken diagnosis. This problem was complicated not only by look alike diseases in these creatures but also by the hysteria that accompanied outbreaks among humans.

¹²¹ Amstutz, 254; Siegmund,

¹²² Siegmund, 1002-1003; Amstutz, 410; Richard F. Keeler, Kent R. VanKampen and Lynn F. James, Effects of Poisonous Plants on Livestock (New York: Academic Press, 1978) 354 .

¹²³ J.N.Shaw, O.H.Muth, " Some Types of Forage Poisoning in Oregon Cattle and Sheep," Journal of The American Veterinary Medical Association 114 (1949): 315-317.

¹²⁴ T.G. Hungerford, Diseases of Livestock, revised edition (London: Angus and Robertson, 1967), 147-148 ; Keller, et.al., 353-361; Amstutz, 410; Mansmann and McAllister, 1212.

¹²⁵ see footnote # 87.

Such hysteria complicated the already difficult job of determining this disease in the two-legged hominid population.

CHAPTER 5: THE DIAGNOSIS OF RABIES IN THE EIGHTEENTH CENTURY: HUMANS

The diagnosis of hydrophobia in humans was often pure speculation. There was one advantage over animals in that more autopsies were done. The results, though, were often anything but conclusive. The literature of this period is replete with numerous descriptions of autopsies of individuals who died of rabies, the vast majority revealing little or nothing of a gross pathological nature. Benjamin Rush noted in humans who died of this disease the autopsies often showed:

Marks of inflammation in the throat, esophagus, trachea, brain, stomach, liver, and bowels. Effusions of water and congestions of blood in the brain, large quantities of dark-coloured or black bile in the gall bladder and stomach, mortifications in the bowels and bladder, livid spots on the surface of the body, and, above all, the arteries filled with fluid blood and the veins nearly empty.¹

Rush noted the case the son of William Todd, aged five, who on September 13, 1802 died of hydrophobia. Rush obtained permission from the parents to perform an autopsy and found the following signs.

All the muscles of the neck had a livid colour, such as we sometimes observe, after death, in persons who have died of the sore throat. The muscles employed in deglutition and speech were suffused with blood. The epiglottis was inflamed, and the glottis so thickened and contracted, as barely to admit a probe of the common size. The trachea below it was likewise inflamed and thickened, and contained a quantity of mucus in it, such as we observe, now and then, after death from cynanche trachealis. The esophagus exhibits no marks of disease; but the stomach had several inflamed spots upon it, and contained a matter of a brown appearance, and which emitted an offensive odor.²

¹ Rush, v. 2, 312-3.

² Rush, v. 2, 327-9.

Another physician named Vaughan noted that an autopsy on an individual who had died of rabies revealed no evidence of inflammation in the stomach, esophagus, larynx or pharynx.³ He observed that the bitten area seemed to be, "scarcely more affected than any other part of the body" and that this area remained unaffected, even after the disease has appeared. Additionally, there was no evidence of the blood or lymphatics being grossly affected by this disease.⁴

A physician/naturalist, John Berkenhout, noted in one dissection that while the organs of deglutition were somewhat inflamed the pericardium, the viscera, the brain and spinal marrow were dryer than usual. Other autopsies were at best contradictory: one individual found the upper digestive tract constricted, while another found it inflamed while a third found the stomach and intestines sprinkled with red spots.⁵ Sometimes the autopsy results were due as much to postmortem changes as to the disease. Berkenhout noted that Morgagni, the famous Italian anatomical pathologist, dissected the body of an individual who died of hydrophobia some sixteen hours after death and found it 'intolerably putrid'. Morgagni further observed the heart was enlarged and the brain dry. At least two other dissections were done by Morgagni who noted that while there was enlargement and distention of some of the organs and blood vessels little or no inflammation was seen. He noted that, based on these observations, a number of scientists believed the seat of the disorder to be the brain and nervous system.⁶

A surgeon, William Babington, left a detailed anatomical description of an individual who died of hydrophobia. He observed that the brain was perfectly normal but the vessels of the dura and pia matter were somewhat distended with blood. There was a very slight inflammation of the epiglottis, reaching into the trachea. This organ was partially filled with a 'glairy' kind of fluid. This fluid appears to have come from the stomach, as this organ also contained the same type of fluid, which the patient was vomiting just before his death. He further observed that the trachea was so tinged with the cinnabar that it left a red stain on the internal coats of the duodenum. The lungs appeared congested, the right lung more than the

³ James Vaughan, Two Cases of Hydrophobia with Observations on That Disease (London: J. Payne and Sons., 1778), 42.

⁴ Vaughan, 41.

⁵ Berkenhout, 18-19.

⁶ Berkenhout, 20-22.

left. All this suggested that the most prominent abnormalities may have been due to the medicine he was taking and not to the disease that afflicted him.⁷

One of the most detailed post-mortem descriptions of a hydrophobia case was that provided in the early nineteenth century by Alexander Marcet. Marcet, who was both a Fellow of the Royal Society and an attending physician at Guy's Hospital, noted that not only was he present when the patient died but also present were Astley Cooper and Henry Cline, two equally prominent physicians of the times. For all the attention to detail, the results of the autopsy was as unimpressive as those of William Babington's case: inflammation of the pharynx with some slight inflammation of the esophagus and stomach as well as congestion of the vessels found on the surface of the brain. As with Babington's case, the most prominent sign, the moderate inflammation of the mouth and pharynx, was probably due as much to the therapeutics as to the disease itself.⁸

Lastly, John Hunter, the prominent eighteenth-century anatomist, physiologist and surgeon, left descriptions of autopsies of those who died of rabies. His comments suggest that the gross pathology seen was at best inconclusive. He noted in one autopsy that aside from slight inflammation of the oral cavity, tongue and esophagus no gross pathological changes were seen. In another autopsy, the results were even less dramatic; all that was seen was some thickening of the epithelium of the esophagus and cardiac aspect of the esophagus.⁹ He considered these specimens important enough to put them in his anatomical museum--[they have long since disappeared]. Hunter's autopsies are important for another reason, they reflect the belief that this disease had the potential to be spread via 'cadaveric poisoning'. While dissecting one of these bodies Hunter accidentally cut himself and, as his brother-in-law

⁷ William Babington, "A Case of Hydrophobia," Medical Communications 1 (1784): 226-227.

⁸ Alexander Marcet, "A Case of Hydrophobia with An Account of The Appearances After Death," Medico-Chirurgical Transactions 1 (1809): 153-55.

⁹ Hunterian Museum, Descriptive Catalogue of The Pathological Series, ed. L. W. Proger (London: E and S Livingstone, 1966), 177-78; E. Allen and J. E. Cooper, "A Hunterian Account of Human Rabies," Veterinary History 1 (1980/81): 146-48; Blaisdell, 1989, 23-24.

Everard Home noted, "for approximately six weeks afterwards suffered great anxiety that he too might come down with the disease."¹⁰

Numerous scientists and medical writers provided a extremely involved set of symptoms for this disease. One of the most detailed was that by Daniel Peter Layard. Layard divided the symptomology in humans into three stages. The first stage, which usually appeared at the full, or the new moon, started with a sharp pricking pain felt in the part where the bite was located. This occurred even though the wound was healed for some time. The pain spread throughout the adjoining areas of the body; if the wound was in a limb the pain would spread throughout that limb. Eventually the pain reached the area of the throat and chest, causing a feeling of tightness and oppression. These feelings in turn caused the patient to sigh involuntarily. The patients' minds then became affected and they became peevish and short-tempered. Their sleep became disturbed; they often suffered from insomnia and when they slept they suffered from terrible nightmares.

In the second stage all the symptoms increased in intensity. There also appeared a burning heat in the pit of the stomach, nausea, vomiting of dark and viscid matter--usually a deep colored and porraceous bile, fever, tremblings, and convulsions. It is at this point that the throat is affected: there is a great thirst, a hoarseness that some mistake for barking, a difficulty in swallowing liquids, though the patient was still capable of swallowing solids, and a copious discharge of a saliva-like froth.

In the last stage, the patient becomes extremely agitated, often violent. It was observed by Layard that even now the patients are generally rational and cognizant of their surroundings. Often patients, afraid they will cause harm to others, suggest they be forcibly restrained. Their appearances become shocking: their eyes are inflamed, staring and wild, their nostrils spread, their mouth open, their tongue hanging out, rough and black. The individuals are now hoarse and suffering from an intolerable thirst. They are also terrified of water as well as any shining or pellucid object, such as a mirror. The patients now froth at the mouth and often endeavor to spit at bystanders. The least glaring light, slightest noise or even the smallest breeze of cool air causes the patients to go into spasms and convulsions. The last symptoms are a rigidity of all muscles, a total inability to swallow, general convulsions and death. Layard notes from first symptom to death is a period of approximately three days.¹¹

¹⁰ Everard Home, A Treatise on Blood, Inflammation and Gunshot Wounds by John Hunter, 2 vols. (Philadelphia: Thomas Bradford, 1796), vol. 1, xlii; Blaisdell, 1989, 24.

¹¹ Layard, 27-30.

Layard's description of the symptoms is more or less confirmed by most other writers on this disease. It was generally accepted that while there was some initial inflammation the wound generally healed without complications. One scientist believed that if on the second morning after the bite occurred there was seen an inflamed circle spreading from the wound then there was reason to believe the animal who made the bite wound had hydrophobic poison in his saliva.¹² Clinical evidence suggests this was not always the case. In one case the wound did become sore and festering just before the symptoms appeared. Another individual was bitten by a supposedly mad cat and within two days his wound became swollen, hard and livid. In spite of this the man recovered with minimal effort.¹³

Even though the wound healed this did not mean an end to the patient's troubles. One author noted that one of the first general symptoms was a pain appearing in the healed wound and spreading along the lymphatics to the heart.¹⁴ In one clinical case the first signs were pains in the bite wound on the arm which spread through the patient's general arm and shoulder.¹⁵ It was the process of initial rapid healing and delayed appearance of inflammation that caused many individuals who were bitten to receive at best minimal care for the bite wound. In at least one case of suspected hydrophobia the bite wound went untreated for three weeks.¹⁶

It was soon after the healed wound began to hurt that the general symptoms occurred. The first of these was a sense of mental depression. One author observed: "Some days after the bite, he [the victim] grows thoughtful, his imagination runs upon uncommon ideas, his sleep is interrupted and he is fatigued with terrible dreams. . . ."¹⁷ Another scientist noted patients often showed signs of anxiety and apprehension while a third believed lassitude, torpidness, and sleep disturbed by terrible dreams was commonly seen. In some cases the patients also

¹² Berkenhout, 11-12.

¹³ James, 35; John Andree, Cases of The Epilepsy, Hysteric Fits, and St. Vitus's Dance To Which Are Added Cases of The Mad Dog, 2nd. ed. (London: W. Meadows and J. Clarke, 1753), 269-70.

¹⁴ Hamilton, 99.

¹⁵ Babington, 118.

¹⁶ Nugent, 2-6.

¹⁷ Desault, 203.

showed dejectness and a desire for solitude.¹⁸ Some patients engaged in what were described as 'convulsive sighs' or broken involuntary inspirations.¹⁹

Soon after the patient begins to suffer a violent pain in the stomach every time he swallows. He also salivates excessively and his saliva, now full of bubbles, froths from his mouth. This last sign was similar to that seen in an epileptic person.²⁰ One author observed that another of the symptoms was a violent pain every time the patient swallows his spittle. He believed that once the fear of water had appeared the condition could not be cured.²¹ The question of whether the afflicted individual had a true fear of water was something that was hotly debated by the scientific community. Most believed it was directly related to the difficulty in swallowing. One author observed:

Hydrophobia is not generally a symptom of the disease caused by the bite of a mad animal. It rarely happens the patient has an aversion to liquid until he finds an insuperable difficulty in swallowing. . . . So the symptom in question is rather a real difficulty of swallowing liquids.

Symptoms such as an uneasy feeling in the throat and a difficulty swallowing all led to a dread of liquids. This same author wrote: "In an attempt to swallow water the patient is convulsed and after two or three painful efforts even the sight of liquids produces horror." Even though the ability to swallow fluids was impaired the ability to take solid food often still existed.²² Another author observed that the problem of swallowing was due to a convulsion of the muscles of the throat and upper digestive tract which caused a sense of suffocation and a boiling heat in the stomach.²³

The clinical cases generally reflected these beliefs. In a case of a boy bitten by a mad dog the youngster had no trouble getting into a bath but found it difficult to swallow fluids; his ability to swallow solids was much less impaired. Both a general inability to swallow and an apparent fear of water became evident in this individual at the very last stage--literally the last

¹⁸ Berkenhout, 3; Hamilton, 99-100.

¹⁹ Babington, 118-119.

²⁰ Desault, 203-4.

²¹ Desault, 203.

²² Berkenhout, 3, 13 .

²³ Hamilton, 100.

day--of his disease.²⁴ This problem of swallowing may also have been in part responsible for the belief that human patients with rabies barked like dogs. One scientist observed:

I am persuaded that the barking like a dog, commonly mentioned as a symptom attending the hydrophobia [in humans] is, at least generally, imaginary; that circumstance being only in a greater degree what happens in an ordinary quinsey, when the parts above the larynx are inflamed, which necessarily must alter the tone of the voice considerably.²⁵

This coincides very closely with what was often seen at post-mortems, moderate inflammation of the oral cavity and pharynx.

In a number of cases from this period the patient became delirious and violently agitated in the terminal stages of the disease. It often started with convulsions which over time became so severe that urine was expelled by spasms and was followed by seminis emissio. In time the convulsions led to delirium. It was at this stage that human patients showed an inclination to bite. In one case a patient was described as tearing and destroying everything near him.²⁶ Eventually he became so agitated that he had to be forcibly restrained.²⁷ In another case the patient became so furious that he "was obliged to be ruled by coercion". He fluctuated between mild and furious delirium, punctuated with short period of sense. It was during one of these attacks that he died.²⁸ Another patient became so delusional that he imagined he was being attacked by imaginary flies, going so far as to strike at them with his hand. Eventually it was necessary to restrain him to keep him from throwing himself out of bed.²⁹ Despite these convulsions the patients were often fairly rational; one indication of this was some patients, recognizing they were becoming uncontrollably violent, requested that they be restrained as a way of preventing harm to others.³⁰

²⁴ Alexander Gray, "The History of A Case of Rabies Canina Attended with Singular Circumstances, and Terminating Fatally, After A Salivation Had Been Induced by Mercury," Medical Commentaries II (1787): 306-10.

²⁵ James, 36.

²⁶ Gray, 315.

²⁷ Hamilton, 103-4.

²⁸ William Gaitskell, "History of A Case of Hydrophobia," Memoirs of The Medical Society of London 5 (1799): 5.

²⁹ Babington, 222-4.

³⁰ Berkenhout, 13.

Death came in many forms. One author noted: "Death takes place not infrequently as strangled with a cord ; sometimes placidly, and without the least struggle; and sometimes, even with a smile on the countenance."³¹ In at least one case the patient in the midst of violent convulsions" fell back in bed, and died; the scene being closed with several of the most beautiful smiles."³²

For all this attention to detail, most of the scientists who investigated hydrophobia recognized it suffered terribly from overdiagnosis. Large numbers of individuals believed to be suffering from hydrophobia in fact suffered from something else. This is best reflected in the fact that a number of individuals with all the clinical symptoms of the disease eventually recovered. For these individuals the most obvious affliction was that of hysterical rabies. Hysterical rabies is fairly easy to identify : if the individual shows symptoms but eventually recovers very quickly one is probably dealing with hysterical rabies.

More than a few of the scholars and scientists recognized both hysteria and hysterical rabies as a major factor in dealing with this disease. One author noted that the symptoms of insomnia and terrible dreams should be placed in the category of accidental symptoms since the fear and consternation which strikes the mind of persons bitten by dogs are more than capable of producing them.³³ A second author observed:

We all know the effects of fear. If a bite from an animal, suspected to be mad, is received, it instantly awakens apprehension for the consequences. This disturbs the mind, and induces a train of symptoms in many subjects resembling what would really have taken place, was the true disease present.³⁴

From the large number of documented clinical cases from this period there are numerous examples of hysterical rabies, cases that were sometimes referred to as 'spontaneous rabies'. According to one modern source hysterical rabies is a disease that sometimes occurs in highly imaginative people.

Their imagination may be so active that they may develop the symptoms of rabies without having the disease. They even may exaggerate the symptoms and go into a frenzy, barking and snapping like a dog even though such symptoms do not appear in

³¹ Hamilton, 104.

³² Babington, 225.

³³ De Sault, 203.

³⁴ Hamilton, 123.

true rabies. True rabies cannot be cured by any known means, but hysterical rabies responds readily to faith healing.³⁵

An eighteenth century source referred to such cases as spurious hydrophobia cases. These cases fell into three categories: (1) those in which the bite which introduced the hydrophobic poison into the body occurred years, even decades before, (2) the cases in which, while there was no bite, the afflicted individual came in contact with the rabid animal and thus acquired the disease, and (3) those cases which occurred spontaneously without the patient ever having been bitten or come in contact with a hydrophobic creature.³⁶

Into this first category belong also those individuals bitten by dogs who probably were not rabid but still came down with the disease. There was the case of a gentleman who was bitten by a dog, and who, because of the terror and apprehension about the disease, came down with the symptoms even though the animal who bit him was not rabid. The afflicted individual was eventually attended to by a physician who recognized the disease as a nervous affliction.³⁷ In another case a weaver named John Lindsay came down with hydrophobia some twelve years after being bitten by a mad dog. The initial symptoms: weariness, headaches and trouble sleeping, quickly developed into a fully developed set of symptoms of the disease. He fell sick on a Wednesday and by Friday the condition was so severe that the patient could no longer swallow water, his breathing was extremely labored and he had a dull pain running from his arm to the region of his stomach. At the same time he was also producing an unusually large amount of saliva, a symptom considered confirmatory of rabies. By Saturday morning Lindsay had become delusional--he imagined a black dog was in the room with him--and began to suffer convulsions. These convulsions grew more intense until he had a massive attack and died at 4 p.m. Saturday. An autopsy was performed but the results were inconclusive. The lungs were shown to be slightly congested and some inflammation was found in the stomach. Said inflammation commenced at the superior orifice and proceeded along the superior curvature of the stomach where it became more pronounced and more severe.³⁸

³⁵ Haggard, 288-9.

³⁶ Samuel A. Bardsley, "Miscellaneous Observations on The Canine and Spontaneous Hydrophobia," Memoirs of The Literary and Philosophical Society of Manchester IV (1795): 447.

³⁷ Hamilton, 141.

³⁸ Bardsley, 431-445.

The second category involved individuals who, while never bitten, came in contact with suspected rabid animals. There are no less than three of these cases, two of which are well documented. The first two, from colonial America, involve individuals coming in contact with sick animals who may or may not have been rabid. The first occurred in Massachusetts in the spring of 1771. The records, now located in the Countway Library of Medicine in Boston, are in the form of a manuscript article prepared by a Massachusetts physician, Henry Wells Montagu. On the eighth of April 1771 Dr. Montagu was called to see a sick farmer, known only as William, who lived in Brattleborough, Massachusetts. The previous evening William had been stricken with severe nightmares; the next day he suffered faintness and stomach upset. When Dr. Montagu saw him he was feeling better, though still somewhat faint and nauseous. Dr. Montagu drew ten ounces of blood and administered Ipecac and Tartar emetic. While the patient seemed to improve over the next few days the nightmares still continued.³⁹ Dr. Montagu drew more blood and administered valencia root, which was an antispasmodic.⁴⁰ On April 10 William complained of pain and cramps in his stomach and bowels. Soon after he suffered convulsions.

It was at this point that Dr. Montagu concluded William was suffering from rabies. The first mention of madness was by the patient himself. On April 15 William began to bark and snap like a dog ; soon after he was heard to exclaim: "Oh dear! I believe I am going mad!"⁴¹ Montagu suggested William acquired this infection as the result of an altercation with a mad dog a year before. On or about March 5, 1770 a strange dog was seen in Brattleborough attacking livestock and other dogs, many of whom would eventually show signs of rabies. When the animal appeared at William's house he set his two dogs upon him. After a slight altercation the strange dog ran off. Both of William's animals initially appeared unaffected. Shortly after the incident one of them began to show a depressed nature, loss of appetite, and a tendency to bite at anyone who came near him. In time both this and the other dog were

³⁹ Henry Wells Montagu, "An Account of An Extraordinary Madness, 1771" in Documents Illustrative of The Early History of The Massachusetts Medical Society, 3 vols., Boston, 1852, Ms, vol.3, pp. 67-68, Rare Books and Manuscripts, Countway Library of Medicine, Boston.

⁴⁰ Colonial Society of Massachusetts, Medicine in Colonial Massachusetts, 1620-1820 (Richmond: University Press of Virginia, 1979), 379.

⁴¹ Montagu, 68.

diagnosed as rabid and destroyed.⁴² William was not bitten by any of these animals. He was, though, bitten some fifteen years before by a dog that died of the common distemper.⁴³

This was not the only time that spring that William had to deal with sick animals. Some two months before William came down with this infection he was called upon to care for some sheep that were, in the words of Dr. Montagu, 'uncommonly disordered'. As if these exposures were not enough the previous winter William had some teeth removed. Complications had set in and William suffered intense facial pain and a dropping eyelid for much of the winter. This had cleared up two or three weeks before his seizures began.⁴⁴ With all these problems it is difficult to say what caused William's illness. Montagu suggested it was from dealing with the sick animals. He wrote: "I am of ye opinion that he might contract it by stroking the dog he took up or handling the sheep, and afterwards applying his fingers to his mouth, whereby he might swallow some of the poisonous froth or saliva."⁴⁵

Despite the best efforts of Dr. Montagu William would remain sick for nearly four months. By the first part of July the worst had passed and from now until the middle of August William slowly recovered. By the first of October he had completely regained his health. William remained in good health for two or three years. Then, after a bout of heavy drinking, the attacks returned, though without the violence of the original ones. William was bled and given Peruvian Bark and mercuric medicines and after several weeks recovered completely. Except for slight fits resembling hysteria William suffered no more problems.⁴⁶

The second case occurred in 1789 when one Abraham Springhead of Albany supposedly died of rabies. He contracted the disease from skinning out a cow that died of madness. Some three months after Springhead began to suffer pains in his arm; they quickly spread throughout his body. Soon after he began to show signs of confusion and disorientation. These became so bad that from time to time he appeared raving mad. During one of these attacks that Springhead died suddenly, probably of heart failure.⁴⁷ The third case involved an individual named John Ellis who in 1794 died of hydrophobia after having been infected by a cow. There was no evidence, though, of a wound being produced by this animal.

⁴² Montagu, 66-67.

⁴³ Montagu, 67.

⁴⁴ Montagu, 66-67.

⁴⁵ Montagu, 67.

⁴⁶ Montagu, 76.

⁴⁷ Connecticut Courant (Hartford) 3 August 1789.

The few details of the circumstances or the symptoms of Ellis makes the case sound similar to the two American cases.⁴⁸

As to the last category--hydrophobia without ever having been in contact with a rabid animal--there are a number of cases. The first involved a singer named Macharini who in June 1784 and again in June 1785 suffered from bouts of spontaneous hydrophobia. These occurred on the same day of the month and each attack lasted about twenty-four hours. Little is known of the nature of the attacks--it is only documented that they involved a fear of water. The lady was of the nervous variety and "not free from obstructions in the viscera of the lower belly."⁴⁹ A second case involved a young girl of sixteen who suffered from hydrophobia as a result of amenorrhea. Her physician noted: "I attended a young girl of sixteen, of a plethoric constitution, who from a suppression of the menses, on their first imperfect appearances, had all the hysterical symptoms (of hydrophobia) to the highest degree; they were followed by a mania, which lasted some days."⁵⁰ Another author related the case of a clergyman who suffered from 'sympathetic hydrophobia'. He wrote: "Some time ago I attended a clergyman who labored under many of the symptoms of (hydrophobia) through the shock occasioned by an official visit to one of his parishioners dying of that disease." This author documented a second case of a man bitten by a mad dog who showed all the signs of the disease. The circumstances, though, led this author to conclude that his malady had originated solely from the terror of imagination. He wrote: "Such cases must be ascribed entirely to nervous irritation."⁵¹

There were also cases where no rabid animal was involved and yet the patient died. The first of these involved a woman 27 years old who, after giving birth to her fourth child, suffered from a series of violent seizures. The fits were soon accompanied by an inability to swallow; this was followed by violent convulsions. The convulsions, continuing for three days, ended in the young woman's death.⁵² There was also the 33 year-old monk of a melancholy disposition who on January 21, 1755 complained of pains in his hips and legs so severe that he could not stand. He had never been bitten or exposed to a rabid animal so it

⁴⁸ S. T., "Hydrophobia From A Cow?" Gentlemans Magazine, 67 (January 1797): 34-35.

⁴⁹ Butt, 90.

⁵⁰ Layard, 39-40.

⁵¹ Dr. Haygarth, "Hints Towards the Investigation of The Nature, Cause and Cure of Rabies Canina," in Catalogus Eorum qui in Universitate Harvardiana 1642 to 1788 (London: Privately Printed, 1788), 6.

⁵² Layard, 44-46.

could not have been hydrophobia. An initial examination revealed that, except for being mentally troubled and depressed, nothing was out of the ordinary. The monk had been out in stormy weather the previous five or six days collecting alms. By that evening he could no longer swallow. He then began to complain of a choking and suffocating feeling which intensified with time.

The morning of the 22nd the monk was suffering from convulsive fits; at times he was so agitated that he had to be forcibly restrained. By noon he was beginning to howl. He still exhibited periods of lucidness during which he exhorted himself to God. He also told his associates he was mad and that he might bite them. By nightfall the monk's fits and howlings became much worse. His face was now disfigured and covered with foam. At 5 a.m. on the morning of January 23 the man died in a very relaxed state--he had become so tranquil before he died that it was no longer necessary to restrain him.⁵³

One of the great unknowns in this period is what caused individuals with obvious cases of hysterical rabies to die. With respect to the woman who had just given birth and the monk the probable culprits were diseases that were common afflictions for this period--childbed fever and quinsey or strept throat, respectively. Childbed or puerperal fever in the nineteenth century was a common affliction among women who had just given birth. It involved a localized infection of the female reproductive tract which quickly becoming a generalized infection, with all the associated symptoms, including delirium, an inability to swallow, vomiting and occasionally hallucinations. A nineteenth-century Maine physician, Dr. Joseph Stevens left a rather detailed description of such a case. A woman suffered from abdominal discomfort at least one week after giving birth. She became nauseated and her abdominal region swollen and tender to the touch. Within two days she became delirious and died very soon thereafter.⁵⁴ As for quinsey, or strept throat, it is well established that some of the more pronounced symptoms were an inability to swallow and a feeling of suffocation--George Washington, who died of this disease, complained of these problems when he was dying.⁵⁵

⁵³ M. Pinchenier, "A Case of A Spontaneous Hydrophobia followed by Madness," Gentlemans Magazine 29 (1759): 401-403.

⁵⁴ Joseph Stevens, "Case Book, 1820s-1840s" Ms, 9-11, Castine Historical Society, Wilson Museum, Castine, Maine.

⁵⁵ Douglas Southall Freeman, George Washington: A Biography, 7 vols. (New York: Charles Scribners Sons, 1957), vol. 7, 637-47.

A disease that was far more commonly mistaken for rabies was tetanus. In the eighteenth century a number of scientists recognized the similarity in symptomology between tetanus and hydrophobia. One author observed: "There seems to be a striking resemblance in many particulars, between some species of tetanus and the rabies canina". This author further noted:

Dr. Currie of Liverpool informs me that in a case of tetanus. . . the wound which gave rise to the disease was so slight and so nearly healed that it escaped the patient's notice. If it had escaped the notice of the attendants also and if they had been unacquainted with the actual appearance of tetanus. . . the disease might have been named hydrophobia.⁵⁶

Benjamin Rush also observed a similarity between the two.

A sameness has been pointed out between many of the symptoms of hydrophobia and tetanus. A similar difficulty of swallowing, and similar convulsions after it, have been remarked in both diseases. Death often takes place suddenly in tetanus, as it does in hydrophobia, without producing marks of fatal disorganization in any of the internal parts of the body. Dr. Physick supposed death in these cases to be the effect of suffocation, from the sudden spasm and closure of the glottis, and proposes to prevent it in the same manner that he has proposed to prevent death from hydrophobia, that is by laryngotomy. The prospect of success from it appears alike reasonable in both cases. ⁵⁷

At least two cases, believed to have been hydrophobia, were probably tetanus. The first, involving a boy bitten in 1778 by a foxhound, sounds like tetanus because of one symptom--Risus sardonicus, or the sardonic smile--which has long been associated with this disease.⁵⁸ This symptom is seen in a number of human "hydrophobia" cases from this period, suggesting that the case of mistaken identity between tetanus and hydrophobia may have been fairly common. A second case involved a farmer who was bitten in September 1775 by a mad dog. The following June a pain developed in the arm that was bitten. He initially attributed this pain to an injury he had sustained during work. He also complained of pains in his joints. Within a day or two he began to suffer from a tremendous thirst--there was no inability to swallow, though. Soon after he suffered from vomiting and retching which sometimes lasted

⁵⁶ Haygarth, 4-5.

⁵⁷ Rush, vol. 1, 265; Phillip Syng Physick, "Case of Hydrophobia," Medical Repository, V (1802): 1-5.

⁵⁸ Vaughan, 7.

all night. This was followed by violent spasms, including muscle spasms which resulted in *Risus sardonicus*. It was during one of these spasms that he died.⁵⁹

Something should be said about the three individuals who supposedly acquired rabies as a result of being associated with either sick cattle or sick sheep. In all these cases the appearance of acute illness following the handling of sick livestock suggests something such as pseudorabies. In three modern cases of pseudorabies in humans neurological symptoms closely approximated those of rabies.⁶⁰ The descriptions sound remarkably like the three cases of madness in humans described above. These three cases may not have been the first documented human cases. A case may have occurred in Massachusetts in the late 1670s. At the same time that livestock were suffering and dying of a disease that closely resembled pseudorabies a lady named Elizabeth Whitaker was suffering a soreness and weakness that lasted all summer.⁶¹

Whatever the confusion it was the fact that hydrophobia was often misdiagnosed that no doubt led to its being frequently overdiagnosed. While this factor may not have done much good for the resident canine population it proved a positive boon for those individuals who provided the numerous 'cures' for this disease, cures that, if the clinical records are accurate, sometimes appeared as noxious as the disease itself.

⁵⁹ Vaughan, 23-29.

⁶⁰ Slaoko Mravak, et al., "Pseudorabies in Man," *Lancet*, #8531 (February 1987): 501-2.

⁶¹ Elizabeth Whitaker, "Deposition #117 in John Godfrey Witchcraft Case, June 1659," Ms, no. 322, v. 2, Suffolk County Archives, Massachusetts Archives, Boston.; John P. Demos, *Entertaining Satan: Witchcraft and the culture of Early New England* (New York: Oxford University Press, 1982), 40 .

CHAPTER 6: TREATMENT OF RABIES IN THE EIGHTEENTH CENTURY: THE ANIMALS

The therapeutics for hydrophobia in the eighteenth century were both involved and extensive. Treatments could be divided into three categories, each related to a certain stage in the disease. First was the treatment of the bite wound itself; this was followed by medicines or therapeutics designed to prevent the general symptoms of the disease. Lastly, there were the therapies and/or medicines that counteracted or relieved the general symptoms. The records indicate that what was thought good for man was also thought good for beast. Veterinary medicine in England in the 1700s was undergoing a period of progressive change and adjustment that would establish the foundations for the scientifically-oriented profession which appeared in the nineteenth century. This change at first glance seems to be largely related to the special status of the horse.

This was the animal who in the eighteenth century received the most medical attention. One modern author has suggested that, along with the dog and the cat, this creature belonged to a class of 'privileged species' or animals who received more consideration with respect to care and maintenance than other creatures, such as poultry or livestock.¹ That the horse received this special attention may in large part be due to the background of the first established organization of veterinary practitioners in England--the farriers guild. Originally blacksmiths who specialized in shoeing horses--one had to be a blacksmith to be a farrier but did not have to be a farrier to be a blacksmith--the farriers were organized into a guild in the middle of the fourteenth century. Because farrier engaged in the shoeing of horses by the time they were established as veterinary practitioners their area of speciality naturally was orthopedics, or ailments of the leg and hoof.

By the eighteenth century certain advances with respect to professionalism were achieved by the farriers. A number of disenchanted surgeons had taken up the veterinary practice. Some engaged in the animal alternative because there was not enough human patients

¹ Keith Thomas, Man and The Natural World (New York: Pantheon Books, 1983), 100-120.

to go around. Others may have done this because they were considered unsuitable for the established medical profession.² A number of surgeon-farriers rose to the top of the their profession, establishing not only lucrative veterinary practices but also providing ground-breaking works on veterinary medicine.

Some farriers treated not only horses but also livestock. There is a family named Britten whose members practiced veterinary medicine in Hampton-on-The-Hill in Warwickshire in the eighteenth century. Their bill records indicated that they treated not only horses but cattle, pigs and sheep. Farriers were not the only veterinary practitioners at this time; there are also records of individuals known as cow leeches. There are the bill records of a cow leech named John Cheshire who practiced at Malvern Hill, in Solihull, from 1761-1773. While his charges do not appear to have been as high as comparable charges for a farrier there is still no question but this individual was engaged in a fairly extensive practice.³ A few veterinary writers and practitioners of this period concerned themselves with man's best friend-the dog. Most work in this area is found in discussions on sports and hunting and deals with such common chronic complaints as worms and mange. Occasionally attempts were made to examine and even treat the more serious afflictions such as rabies and distemper. One of the most prolific of the writers on canine medicine was a surgeon-farrier named William Taplin. Among Taplin's writings is a work, entitled The Sportsman's Cabinet, which is in a large way a reflection of the attitudes toward, and concerns about the diseases of the canine species.

The movement towards professionalism by the veterinary practitioners and scientists was not always reflected in the approaches towards the treatment of hydrophobia. There were still being published in the eighteenth century the works of Gervase Markham, works that treat the bite wound by taking a live pigeon, cutting it open and laying the body on the wound as a

² There is in the special collections section of the Countway Library of Medicine in Boston Massachusetts a reference to one George Dadd being turned down for a license by the Massachusetts Medical Society. Dadd went on, though, to become one of the establishing giants in the American veterinary profession. See: "Massachusetts Medical Society, Testimonials of Medical Qualifications, 1845, 1846," Ms, Rare Book Collection, Francis A. Countway Library of Medicine, Boston.

³ J. Lane, "Farriers of Georgian England", in The Advancement of Veterinary Science, ed. A. R. Michell (Cambridge: C.A. B. University Press, 1993), 106, 115-117.

way to draw out the venom.⁴ Far more common were no remarks at all. Up-to-date works, such as Gibson's New Treatise on Diseases of Horses and Bartlet's The Gentleman's Farriery make no mention of hydrophobia or even the bite of venomous beasts.⁵

This does not mean that no attempts were made to examine the disease in animals. William Gibson discussed this affliction in some detail in his 1722 work. His discussion generally involves treating the bite wound followed by giving preventives for the general symptoms.

There are infinite ways of curing these bites, some give fire immediately (cauterize) some cut out the part that is wounded, but the operations cannot be allowed in all parts, but chiefly when the wound is made in the flesh, and free from the nerves and sinews; others apply Garlick, Onions, Bay Salt, and Bacon stamp't together into an ointment. . . and there are some who only lay over the wound venice treacle or mithridate, which are very good. . . . But when the poison is once got into the mass of the blood, the chief part of the cure must be owing to inward means, which ought constantly to be used at the same time proper applications are made outwardly.

Gibson departs from the general medical public in suggesting that something known as counter poisons be used, an apparently modern version of Dioscordies 'liver of the mad dog.'⁶

Gibson was not the only individual who put disproportionate reliance on the treatment of the bite wound. In a later work it was noted that the main treatment consisted of dealing with the bite wound. The first treatment consisted of washing out the wound with vinegar, human urine or, if neither was available, a mixture of salt and water. The wound is next cauterized. After that numerous salves or plaisters were applied to the bite wound to prevent the spread of the poison. One was an infusion of four or five handfuls of Plantain leaves boiled in a pint of olive oil. This produced a mixture which when applied to the wound was thought to be very efficacious against the poison from bite of a mad dog. Another consisted of applying to the bite wound a plaister made up of Armoniac, barley meal which was mixed with plantain leaves, and egg whites.

⁴ Gervase Markham, The Citizen's and Countryman's Experienced Farrier (London: James Adams, 1764), 286.

⁵ William Gibson, A New Treatise on The Diseases of Horses (London: A. Millar, 1751); J. Bartlet, The Gentleman's Farriery or A Practical Treatise on The Diseases of Horses, a new ed. (London: A. Millar, W. Law and R. Cater, 1788).

⁶ William Gibson, The Farrier's New Guide (London: William Taylor, 1722), 207.

There was also a medicine which was given internally to prevent the general symptoms. Curiously, this medicine was only suggested for swine. It was made up of: Rue, Centaury, Box Leaves, St. John's Wort, and Verain, mixed together in four gallons of beer. The mixture is then boiled, strained, and mixed with one gallon of water. To this is then added a mixture consisting of flower of sulphur, madder root, coriander seeds, ground oyster shells and ground crab or lobster claws. This mixture was enough for twenty five pigs⁷. [The fact that this was only for swine and that the recipe was designed for a large number of animals seems to suggest that some affliction--pseudorabies?-- with symptoms similar to hydrophobia, perhaps was seen among swine at this time. While the disease appeared identical to rabies it was in fact much less fatal.]

One of the most detailed discussions of hydrophobia by a veterinary scientist was that by Henry Bracken (1687-1764), a physician-turned-veterinarian. The son of a Lancaster surgeon, Bracken received an extensive medical education. After serving a surgeon's apprenticeship he went first to London, then to Paris and Leyden to continue his medical education. While in Leyden Bracken studied under Boerhaave. After Leyden he returned to Lancashire where he quickly established himself as a prominent physician and surgeon. Despite his success in medicine he often found his fellow practitioners both pretentious and incompetent. This scorn may be part of the reason he eventually took up the practice of veterinary medicine.

Bracken was both a horse owner and a horse lover and as such had a more than passing interest in the care of these animals. Yet he, with one exception, hated and loathed those who practiced veterinary medicine. The one exception was an old army farrier who Bracken considered both his friend and his instructor in veterinary matters. Through this gentleman Bracken learned to diagnose animal health problems and then prescribe treatments; in time he became very proficient in veterinary science. Bracken appears to have practiced both human and veterinary medicine and the result of this combination led him to conclude that the treatment of animals was the more difficult of the two. He noted: "The art of farriery is the more skillful business of the two, that is, it requires more judgement and learning to be an expert farrier than an expert physician, and in my opinion he that thoroughly understands the first understands

⁷ Henry Bracken, Taplin Improved or A Complete Treatise on The Art of Farriery (New York: Francis Adancourt, 1815).

both professions."⁸ It was from this background and with this attitude that one of the more detailed eighteenth century discussions of rabies in animals is seen.

Bracken, like his fellow veterinary scientists, laid heavy emphasis on treating the bite wound. He suggested that this may be the only effective treatment.

It is much doubted by the most ingenious men, whether or no there is any cure for the bite of the mad dog when the venom has once taken root, but that the same may be hindered from communicating with the mass of blood, if the part affected be managed as it ought, no one should make the least scruple. And in order to this end, let the wound as soon as possible be cauterized with a hot iron.⁹

Bracken believed cauterization should be employed only if it could be done with relative safety and ease. If the bite was near either nerves or tendons this therapy might damage these structures. He also believed cauterization should be done with a small pointed iron and that only the wound should be burnt. Bracken believed the next best therapy was keeping the wound open for at least forty days to allow it to drain. The draining process might be encouraged with an irritant which was rubbed in the wound. Bracken also suggested that an infusion of vinegar and mustard seed be applied as warm as possible as a way of cleansing the wound. All this suggests that Bracken considered treating the bite wound top priority.

This attitude was reflected in the writings of other reputable farriers. One such individual, William Merrick, noted that with respect to the bites of venomous beasts, included the mad dog, first and foremost the bite wound must be attended to. For this he recommended either cautery or incising the whole wound. Additionally, mixtures of onions, garlic, bay-salt, and bacon were to be applied to the wound; other ointments that were effective included either mustard seed, pickled herrings and black sope or mixtures of mithridate or Venice Treacle mixed with spiritous embrocations.¹⁰ Other veterinary practitioners relied not only on wound treatment but also on general medicines. For many of these therapeutics it was important not only what was given but when it was given. One author, Francis Clater, noted a medicine for the general symptoms should be given the night preceding the full of three successive moons.¹¹

⁸ Smith , vol. 2, 29-33.

⁹ Bracken, 1738, 308.

¹⁰ Merrick, 1788, 389.

¹¹ Francis Clater, Every Man His Own Farrier, 2nd ed. (London: Warne, 1786), 131.

It was not only the animals with special status--horses and dogs--who received these medicines; livestock received them as well. One author noted at least 31 dogs, 10 pigs and two horses who received treatment for rabies.¹² Another author recorded at least 32 dogs who had received a special treatment for this disease. He further observed that he had treated dogs and other animals in the hundreds for this disease and that only a few had gone mad.¹³ The medicines given to horses, dogs and even swine matched very closely those given to humans. Sometimes there were even directions for certain medicines as to specific dosages for human and/or animals. Found in the manuscript collection of The Royal Society is a receipt for a medicine for treatment of the bite of a mad dog. Made up of treacle and crabs claws, this medicine is mixed with milk when it is given to animals. If the medicine is given to humans it must be given in a strong white wine. For both groups it must be given at the time of either full or new moons.¹⁴

What may be the most representative example of 'what is good for man is good for beasts' is found in a detailed description of the treatment of a horse bitten by a mad dog. First the wounds were treated with a strong mercurial ointment. Then the creature was bled and given certain so-called 'patent medicines' that were used to prevent the appearance of hydrophobia. One such medicine is made up of Lichen Cinercus Terrestris while another contained a powder of Antilyssus. After that the animal then received the so-called 'bathing treatment'. Soon after the bathing treatment was finished the first general symptoms of hydrophobia appeared. The animal now received a medicine made up of musk and cinnabar. Despite this the symptoms increased in severity, a factor which caused the owner to lament that he had not used the Turpeth mineral treatment. In the end the symptoms became so severe that the animal was destroyed.¹⁵

Of all the therapies the most popular have to be the 'patent medicines' from the early eighteenth century. One such medicine, that would come to be known as Dr. Mead's powders, had its origin in two different events. The first occurred on November 16, 1671 when Sir

¹² Dalby, 10-19.

¹³ James, 9.

¹⁴ Sir Robert Gourdon, Knt. R. S., "A Receipt to Cure Mad Dogs, Men or Beasts Bitten by Mad Dogs" Royal Society, Classified Papers 1660-1740 (London: Royal Society, 1740) no. 33.

¹⁵ John Starr, "An Account of An Horse Bit by A Mad Dog", Philosophical Transactions 46 (1749-50): 474-78.

Robert Moray exhibited a plant at a meeting of the Royal Society that he claimed was an excellent treatment for dogs that were bitten by mad dogs. He noted as proof that the Duke of York had administered this plant to a whole kennel of dogs that had been bitten by a mad one and that all but one had recovered, the one that failed not having received the medicine.¹⁶ In a letter of July 6, 1672 Henry. Oldenburg, who was secretary of the Royal Society of London, noted the plant was "efficacious in curing dogs bitten by mad dogs."¹⁷ Both Moray and Oldenburg noted John Ray in his Historia Plantarum referred to the plant as '*Lichen terrestris cincercus*'.¹⁸

The medicine achieved notoriety from an article in The Philosophical Transactions of The Royal Society that was based on a letter from George to William Dampier¹⁹ extolling this plant as an effective treatment for the bite of mad animals. George Dampier got the receipt for this plant from his uncle who, from the remarks in the article, appears to have been a veterinary practitioner whose therapeutics often bordered on folk medicine. Dampier noted that after a particular outbreak of disease among cattle at Charmister, near Dorchester, a conjurer was called in and claimed the affliction was caused by someone with a grudge putting a hex on the herd. The conjurer tried charms and spells but to no avail. At this point Dampier's uncle was called in and, after having had the animals removed from the pasture and driven through the river, used his magic cure with the result that not one animal came down with the illness. In time the disease cleared up--but not before forty out of two hundred and fifty died.²⁰

¹⁶ Thomas Birch, The History of The Royal Society of London, 4 vols. (New York: Johnson Reprint Corporation, 1968), vol.2, 492.

¹⁷ John Ray, The Correspondence of John Ray: Consisting of Selections from The Philosophical Letters Published by Dr. Dirham, and Original letters of John Ray in The Collection of The British Museum (London: Printed for the Bay Society, 1848, reprint, New York: Readex Microprint, 1971) 98 (page reference is reprint edition).

¹⁸ John Ray, Historia Plantarum, 3 vols. (London: Samuel Smith and Benjamin Waterford, 1686-1704), vol. 1, p. 117.

¹⁹ William Dampier was a famous explorer and seaman in late seventeenth-century England. See: Professor J.K. Laughton, "William Dampier," Dictionary of National Biography, vol. 14, 2-6.

²⁰ George Dampier, "Part of A Letter to Mr. William Dampier Concerning The Cure of The Bitings of Mad Creatures," Philosophical Transactions of the Royal Society 20 (1700): 49-52.

Uncle Dampier's real contribution to the advancement of veterinary science was the drug that supposedly prevented madness in animals. George Dampier noted his uncle also used the drug to treat madness once the symptoms appeared, but with mixed results. He wrote: "Our uncle Dampier hath cured both man and beast when mad but with much care and trouble."²¹ Dampier further observed that the most therapeutically effective way to administer the medicine was just after the individual had been bitten, before the symptoms appeared.

After a dog hath bitten man or beast, it will not appear or begin to grow mad till after a full and new moon, or new or full, but when it begins to be mad, tis very hardly cured. . . . Therefore when you know anything to be bitten or suspect it to be so, use the remedy as soon as may be after, and then, when given in time, it prevents all signs of madness at all.²²

Dampier also dealt with the argument that haunted all the drugs for rabies--they worked because the disease was not present in the first place. He noted animals that were treated with this drug never went mad and that the only animals that went mad were those that had never received the treatment.²³

He provided an elaborate description of both the preparation and the administering of this compound. With respect to preparation, Dampier wrote: "You must dry it in an oven. . . , then powder it, and pass it through a renege or fine sieve, the which mixed with the like quantity of fine beaten and powdered pepper, is the composition."²⁴ Dampier discussed in detail the administering of this medicine to the dog, the cow, and the human. In all cases the individual in question must be bled and washed. While the first procedure is in tune with the humoral beliefs of the time the second seems to be more empirically based. Dampier reinforced this possibility when he noted, with respect to humans:

To a man or woman it (the medicine) must be given after . . . well washing the face and hands, or place that may be bitten, or all the cloaths that the person had on him or her,

²¹ Dampier, 50.

²² Dampier, 50-51.

²³ This remark plus the description of the outbreak among cattle strongly suggests that the affliction may have been a disease, such as pseudorabies, that responds favorably to support therapy. See: Dampier, 51.

²⁴ Dampier, 51.

when bitten, to wash away the snivel or drivel that comes from the mouth of a dog, or other creature when mad, *for that is the only reason for washing*²⁵. [my italics]

Dampier referred to the plant as "Jews Ear", largely because of its association with a plant, *Fungus sambuicinus*, which was called "Jews Ear". Sir Hans Sloane, though, noted it was the *Lichen cinereus terrestris* which was mentioned by Ray in his History of Plants.²⁶

Dampier's medicine was not the only medicine supposedly shown to be successful in treating hydrophobia in animals. From the seventeenth and eighteenth-century records at least two other medicines were prescribed for such usage. The first, dating from 1687, was called 'Starr of The Earth'. Along with crab's claws and venice treacle, this was given to dogs at least three mornings before the new and full moons. The administering of this medicine to humans appears almost as an afterthought, suggesting that it was designed primarily for animals.²⁷ This belief is further reinforced by a later article discussing the same medicine. The article not only noted that the medicine was administered to the hounds of the Royal Kennel after a number were bitten by a supposed mad dog²⁸ but that the first reference to this particular drug was in a 1652 veterinary work by Thomas De Gray entitled The Expert Farrier. [De Gray used it mainly on horses and cattle though he did note that it was once used to treat a ten year old boy.]²⁹

That animals, especially dogs, might have responded so favorably to these medicines was due to the overdiagnosis of rabies. A late seventeenth-century article outlining several cures for madness in dogs noted that these animals were subject to seven types of madness, of which only two were associated with hydrophobia. The author, in his attempts to distinguish one type from another, relied solely on symptoms, a poor criteria for the diagnosis of rabies since any number of conditions can mimick it. The general symptoms of the five 'other madnesses' were as follows: "In them the dogs will not eat, not at any time when they are sick,

²⁵ Dampier, 50.

²⁶ Dampier, 49, 52.

²⁷ Sir Robert Gourdon, "A Receipt to Cure Mad Dogs, or Men or Beasts Bitten by Mad Dogs," Philosophical Transactions of the Royal Society 16 (1686-87): 298.

²⁸ Anonymous, "A Letter from The Reverend Mr. Thomas Steward, V.D.M., to Dr. Mortimer, Secr. R.S. Concerning The Virtues of The 'Star of The Earth', *Coronopus* or *Buckshorn plantain*, in The Cure of The Bite of The Mad Dog," Philosophical Transactions of the Royal Society 40 (1737-38): 452.

²⁹ Anony., 1737-38, 455; Thomas De Gray, 160.

but in these five, they live 8 or 9 days without hurting anybody and then die of hunger."³⁰ These symptoms can be easily applied to both the prodromal and the paralytic phases of rabies in addition to the 'other madnnesses.'

The American, Benjamin Rush, also believed what worked for humans worked for dogs. He noted two dogs who were cured of this disease by excessive bleeding. In one case the tail of an animal was cut off--hardly pleasant therapeutics. For all the brutal aspects of this treatment Rush believed he was doing these creature a great favor.

I mention these facts with pleasure, not only because they serve to support the theory and practice which I have endeavored to establish in this disease, but because they will render it unnecessary to destroy the life of a useful and affectionate animal in order to prevent his spreading it.

These remarks suggest Rush was anything but a cruel and callous individual with respect to animals, a fact that is reinforced in many of his writings.³¹

Other methods of rabies treatment in dogs were even less orthodox. One of the less pleasant therapeutics was not even a treatment but rather a form of prevention--removing the 'worm' underneath the tongue of the dog. A treatment that dated back to the Roman author Pliny, by the late seventeenth century this measure had largely been discarded and denounced by the established medical profession.³² Despite that, it survived well into the eighteenth century as a sort of quasi-folk measure. It was not totally ignored by the established medical writers of this period. The comments in the eighteenth-century medical works reveal three things : first, it was generally accepted by the educated medical populace that the so-called 'worm' was not a worm at all. Second, it was further agreed upon that removing it did little or nothing to prevent this disease and lastly, despite the two previous conclusions the medical writings of this period established that the removal of this structure was being done on a regular basis by many of the folk / quack veterinary practitioners.

One of the most outspoken on this subject was the physician Robert Hamilton. While he was certain this structure was no worm, Hamilton was not sure exactly what it was. He did

³⁰ Sir Theodore Mayern, " An Account of The Diseases of Dogges, and Several Receipts for The Cure of Their Madness, and of Those Bitten by Them," Philosophical Transactions of the Royal Society 16 (1686-87): 408-410.

³¹ Rush, vol. 2, 321; John Blaisdell, " Benjamin Rush (1745-1813) and The Humane Treatment of Animals," Veterinary Heritage 13 (1991): 14-30.

³² Blaisdell, Hist. Med.Vet., 1991, 37-38.

note that some believed it to be a nerve, others thought it a gland and still others thought it was a tendinous ligament. Hamilton, while he concluded it was neither a gland nor a nerve, was less than positive on its true structure and function. "What may be the real use of this organ in dogs, I must leave to more able and accurate physiologists."³³

Hamilton observed that the practice of 'worming' dogs was still performed extensively in his time. He noted one gentleman named Ripshaw, keeper of the Ipswich Goal, who claimed to have wormed hundreds of dogs, so many that he had developed a reputation as a dog doctor. For all his success with the worming procedure, his luck with the procedure's main function--the prevention of rabies--proved imperfect. Ripshaw noted a dog he wormed eventually went mad and bit a gander, a cow and a spaniel, all of whom also went mad. In another case Ripshaw wormed a puppy who three years later went mad and bit a number of other dogs, all of whom came down with the disease.³⁴

This apparent lack of success may have been in part responsible for an adjustment in the claims with respect to this procedure. Hamilton quoted one individual, writing in February 1785 in the Ipswich Journal, who noted that removing this tendon--he called it a tendon not a worm, already evidence of a change in attitude--may not stop the animal from going mad but it would act as a preventive against mad dogs biting.

Experience having shown time out of mind, that by taking out the tendon that grows under the tongue, not one single instance has ever happened of any person being bit by a dog so wormed. It has been observed that out of several packs of hounds, and many other dogs, that have been mad, those wormed have fallen off their meat, refused water and always died sullen, or sleepy mad.³⁵

Hamilton believed the success of this procedure may have been due as much to misdiagnosis as anything else. "It should, however, be remembered that madness is not the only distemper to which dogs are liable. Many have, no doubt, been called mad, that were affected with other diseases."³⁶

Hamilton was not the only eighteenth-century scientist who believed 'worming' was highly suspect. Dr. Fothergill expressed general reservations about this practice when he noted: "The operation of worming. . . though extolled by some, is despised and ridiculed by others".

³³ Hamilton, 135-142.

³⁴ Hamilton, 147-8.

³⁵ Ipswich Journal (Ipswich, England) 19 February 1785; Hamilton, 143.

³⁶ Hamilton, 145.

Fothergill, like Hamilton, attempted to anatomically identify this structure, but with limited success.

On examining this white worm-like substance which originates under the point of the tongue, it is a natural portion of the tongue, slightly attached to a gland at each extremity; of a cylindrical form, dense, and resembling a tendon. Its extraction does not visibly injure any of the animal functions and its use remains wholly unknown.³⁷

John Berkenhout provided some discussion of both the structure and the worming of dogs. He noted that the structure under the tongue was certainly no worm ; neither was it a nerve. Berkenhout based the latter conclusion on the fact that the structure was of an elastic nature, something nerves were not. Berkenhout was most critical of its removal when he noted: "It is certainly of use to the dog and its extirpation answers no salutary purpose."³⁸

Such brutal treatments were not confined to dogs alone. A valuable cow belonging, to one Hurdiss Fordan of St. Lucy's Parish in the Barbadoes, had developed all the symptoms of madness. She treated in the following manner: "Having thrown her down upon a dunghill, he (the owner) directed his slaves to keep her mouth open, while he poured by degrees, down her throat a large pailful of cold water." These efforts seemed to do the trick for the cow recovered completely within 24 hours.³⁹

This was not the only folk/quack treatments that were still in existence in the eighteenth century. Of a far less invasive nature was the use of divine intervention, in particular the divine intervention of saints. The miraculous church cure of St. Vittau of Apulia was considered valuable in treating hydrophobia. It involved chanting the following hymn in a church on three successive Saturdays.

O holy Vitus Pellicanus who guards the Apulian
Coast, and the Polyignamic shore, who cures the
bite of mad creatures, and mitigates the rage of
dogs, O holy Vitus avert the dreadful rage, The
dismal howling of dogs, and the cruel infection.
Madness get thee hence and fury keep far from
me.

³⁷ Fothergill, 184.

³⁸ Berkenhout, 11.

³⁹ Anonymous, " A Probable Cure for The Bite of A Mad Dog," Gentlemans Magazine 20 (1750): 195.

At St. Peter's church at Burges there have been services specifically performed to allay the disease of hydrophobia.⁴⁰

A manuscript in the Royal College of Surgeons Library, dating from the early eighteenth century, discusses in some detail the process of divine intervention against hydrophobia. The process is aimed at treating the dog who did the biting. "If you have any faith in charms, the following word wrott on a peece of cheeze and given the dogg that's bitten I am told has done wonderful cures".

Carnis, Darnis, Farnis

Farnis, Darnis, Farnis.⁴¹

The physician, John Berkenhout, additionally noted one of the old favorite miraculous cures for rabies, the artifactts of St. Hubert.⁴²

There is a vestment of St. Hubert preserved in a chest with six locks. The keys of which are kept by six different vergers. For these fourscore years they have been continually cutting off pieces from the holy vestment. Nevertheless it remains, to this day, perfectly entire. . . They cut off a piece of robe, and incarnate a thread between the skin of the patient's forehead. A person thus cured becomes possessed of a power to postpone the hydrophobia during forty days in any of his acquaintances.⁴³

The authors who discuss these treatments give no indication how seriously they themselves took them. That they are mentioned at all in at least three works from the eighteenth century suggests someone took them seriously. In all probability, along with worm cutting and numerous herbal remedies, the religious and folk cures were practiced by many of the rural

⁴⁰ DeSault, 229.

⁴¹ J. Barnardiston, "A Cure of the Bite of A Madd Dog, 1782(?)", Ms, Library, Royal College of Surgeons of England, London.

⁴² St. Hubert, an early Bishop of Leige, is considered the patron-saint of huntsmen and hunting dogs. It was believed in Medieval Northern Europe that many of his relics, if heated and place on the bite wound, would prevent hydrophobia in both humans and animals. See Holweck, 492-493; L. HuygheBaert, 142-158; "Hubert of Maastricht, Saintt." The New Catholic Encyclopedia (New York: McGraw-Hill Book Co., 1967), 182; Farmer, 198.

⁴³ Berkenhout, 68-70.

populace in the British Isles at this time. In some parts of the British Isles folk veterinary medical cures were regularly and consistently practiced well into the nineteenth century.⁴⁴

One of the most popular treatments for rabies in animals in the eighteenth century involved the use of mercuric medicines.⁴⁵ The use of mercuric salves or ointments has a long history in both human and veterinary medicine. There are records of these medicines being used to treat skin conditions in eleventh and twelfth centuries hunting dogs and falcons.⁴⁶ They came in two forms: ointments and internal medicines. With the ointment in at least one case-- that of a spaniel bitten by a mad dog--the process seems to have been identical to that for humans.⁴⁷ It also was observed that in certain animals a triple quantity of mercurial ointment should be used.⁴⁸ If the mercuric ointments were considered efficacious in the treatment of hydrophobia in animals, Cinnebar was seen by at least one author as a wonder drug. In a work entitled The Virtues of Cinnebar and Musk against The Bite of A Mad Dog this drug was touted as an unquestionable success.

No preventive medicine was ever given with greater success than a composition in Dr. Bate's dispensatory entitled 'decoctum ad morsum canis rabidi'. . . . It is likewise the

⁴⁴ For an overview of folk veterinary medicine in the British Isles in the eighteenth and early nineteenth centuries the following works should be consulted: L. F. Newman , "Folk-Lore and The History in Veterinary Medicine," Proceedings of The Royal Society of Medicine 45 (January 1952): 94-96; Thomas Davidson, "The Needfire Ritual," Antiquity 29 (1955): 132-136; Thomas Davidson, " Animal Treatment in Eighteenth-Century Scotland," Scottish Studies 4 (1960): 134-149; Thomas Davidson, " A Survey of Some British Veterinary Folklore," Bulletin of the History of Medicine 34 (1960): 199-232; Thomas Davidson, "Veterinary Practice before The Nineteenth Century," Sudoffs Archives 51 (1967): 19-43.

⁴⁵ Anonymous, "Excerpts from Mad Animals, An Easy Method of Treating Persons Bit by Them," Gentlemans Magazine 26 (1756): 567-568 ; John Haynes, "Case of Fatal Termination After The Bite of A Mad Dog," Memoirs of The Medical Society of London 5 293-301; Mr. Falkner, " A Case of The Hydrophobia," Medical Transactions 2 (1772): 222-225; Darlus, " A Method of Preventing The Terrible Consequences of The Bite of A Mad Dog by The Means of Mercury," Scots Magazine 17 (1755): 390-392.

⁴⁶ John Blaisdell, " Health of The Working Birds: Possible Sources for Remarks in The Boke of St. Albans on Diseases of Falcons," Argos, 5 (1991): 121-125.

⁴⁷ James, 19.

⁴⁸ Houlston, 59.

same medicine that, of late years, hath frequently been published in almost every newspaper in the kingdom.⁴⁹

The author discusses in some detail cases of dogs, horses and even pigs treated with this medicine. He describes the proper means of dosing these creatures with this medicine. A rather involved set of directions was provided for pilling an animal.

A small rope with a loop at one end was passed through the dog's mouth, beyond the canines, and brought over the upper jaw; where, being drawn tight, by the noose, and the other end passed over a pulley, fixed to a beam, the dog was thereby suspended. The dose being placed at the edge of a drenching horn, in which was a spoonful of warm milk, it was without difficulty, conveyed down his throat, the lower jaw being, at the same time, kept open by another rope.

This author also observed that this method of pilling or drenching was better calculated for swine than for dogs. This was because dogs would eat almost anything. Thus if one allowed the canine to fast a little before the medicine was given and the medicine was given in a ball of butter he would generally swallow it without chewing it.⁵⁰

Another medicine considered very effective in dealing with hydrophobia in animals was Turpeth Mineral. It not only caused excessive salivation but also acted as both an emetic and a purgative. This medicine was also a mercuric-based. One author who extolls its value, James, also provided a detailed set of instructions for administering the drug.

The difficulty of giving the mad dog a dose of turpeth mineral, I find, has been objected by some as an insuperable obstacle to the method of cure I recommend but there is nothing more easy. Two pair of doples, or one collar with two pair of chains to it, will readily fix a dog's head in such a position, as to make it impossible for him to turn and bite; then compressing the skin of his neck, with one hand, to make him open his mouth, a ball fixed to the end of a thin hazel stick, or whale bone, is thrust down his throat without difficulty.⁵¹

If the therapeutics for rabies in animals was complicated that for humans was downright appalling. For many of the two-legged patients the treatment was often worse than the disease.

⁴⁹ Dalby, 5.

⁵⁰ Dalby, 10-11.

⁵¹ James, 36-37.

CHAPTER 7 : TREATMENT OF RABIES IN HUMANS IN THE EIGHTEENTH CENTURY

Treatment of human victims of rabies closely matched that for animals. The one major difference was the change in attitude towards different therapies as the century progressed. As the eighteenth century passed the numerous medicines and therapies used as either preventatives or as counteractives for the general symptoms were abandoned or discarded as ineffective. By the late eighteenth century the therapeutics most accepted involved (1) the aggressive treatment of the bite wound and (2) palliative medicines which attempted to relieve or at least lessen the symptoms.

It could be argued this shift in treatment was a reflection of the increased ability by the medical profession accurately to diagnose this disease. The available evidence, though, does not reinforce that conclusion. In the nineteenth century prominent medical scientists were still engaging in both the mis and overdiagnosis of rabies. In the minutes of the Physical Society for Guy's Hospital, one of the most prestigious of the London medical societies existing in the eighteenth century, there is from January 11, 1796 a number of references to spontaneous hydrophobia in humans. According to the presenter, a surgeon named Wilkinson, hydrophobia in humans could occur as the result of any emotional agitation, including sex. Wilkinson related the case of a servant girl, who as the result of being 'amorously involved' with a young man during her menstruating period, came down with and died of hydrophobia.¹ This indicates the ability to diagnose accurately this disease was even by this late date anything but foolproof.

Justifications for the many different drugs used in the eighteenth century were as varied as the drugs themselves. Some were empirical and popularity of the drugs rose and fell with their success. Others came with involved physiological explanations as to efficacy. For example, if hydrophobia involved an overstimulation of the nervous system, then any effective treatment must counteract this overstimulation. This explanation was particularly popular for opiates. Another explanation involved the use of mercuric compounds as a form of 'salivary purge'. Since the poison for hydrophobia was found in the saliva and since mercury caused excessive salivation, the use of this compound would 'flush' the poison out.

¹ Wilkinson, "Minutes, Physical Society, Guy's Hospital, January 11, 1796" Ms, Library, Guy's Hospital Medical School, London.

One of the most prominent of the early eighteenth-century physicians, Richard Mead, became famous in part because of his therapeutics against rabies. Mead's initial approach to this disease consisted of a number of therapies. He believed treatment, in order to be effective, had to be done immediately after the patient was bitten, before the fear of water had appeared. Once the symptoms appeared it was generally believed the disease was incurable.² Mead dismissed folk cures, such as eating the liver of a mad dog, but gave credence to those cures that worked in a physio-mechanical manner. He included Dampier's powders in this category of drugs, which also included madwort, *Terra lemnia*, garlic, leuconium and agrimony.³ Mead believed the best cure was the submerging of the patient in water. He noted the physio-mechanical reasons for this treatment's success involved the cold water causing a constriction of the vessels which counteracted the dilation caused by the fermentation of the blood in a case of hydrophobia.⁴

Mead's most famous treatment was a derivative of Dampier's medicine, the treatment so popular with dog owners. He initially had reservations about this medicine. His lukewarm support for these powders was reflected in his reviews of it. In particular, a discussion of treatments in The Philosophical Transactions makes only a passing reference to this medicine.⁵ This attitude is further reinforced in a 1705 article by Mead discussing three cases of hydrophobia. No mention is made of *Lichen cinereus terrestris*, instead the therapeutics are limited to something called 'Theriac Andromach'. There is also a throwback to classical times--the patient in one case endured the discomfort of an earlier cure--he was forced to eat the fried liver of the dog that bit him.⁶

By the late 1720s Mead's attitude began to change, at least with respect to these powders--they were now referred to in the literature as Mead's powders. The first references to Dr. Mead's powders appeared in 1727 in the London Evening Post. In that and a 1735 article in the Gentleman's Magazine there was a rather extensive discussion of the medicine by an individual who was an acquaintance of Dr. Mead. He wrote: "I have since waited on the

² Mead, 1702, 89.

³ Mead, 1702, 92-93.

⁴ Mead, 1702, 93-95.

⁵ Sam Morland, "An Abstract of Dr. Mead's Mechanical Account of Poisons," Philosophical Transactions of the Royal Society 23 (1703): 1320-1328.

⁶ Richard Mead, "An Account of Three Cases of The Hydrophobia," Philosophical Transactions of the Royal Society 26 (1708-9): 433-438.

doctor, and he was pleased to tell me, that in the experience of above thirty years, upon more than 500 patients, he had never known it to fail of success."⁷ He described how the medicine should be both prepared and administered.

Let the patient be blooded at the AM nine or ten ounces-Take of the herb called in Latin Lichen terrestris, in English Ash Colored Ground Liverwort. . . .half an ounce--of black pepper, powdered, two drahams--mix these well together, and divide into four doses, one of which must be taken every morning fasting, for four mornings successively, in half a pint of cow's milk. After the four doses are taken the patient must go into a cold bath, or a cold spring or river, every morning, fasting for a month.⁸

In the 1735 edition of the London Magazine there is a discussion of Dr. Mead's cure. Unlike the previous two accounts this article makes no great claims for this medicine--rather it is a receipe for compounding and administering the drug.⁹

This short notice records the number of patients treated by Mead for hydrophobia was more than 500. Even for a thirty-year period this seems excessive. Yet there is further evidence that this number may be low. In a 1748 edition of the Scots Magazine there is a discussion of Dr. Mead's drug which included both the recipe for making up and administering the compound and a short discussion of its efficacy.

In Fife and some neighboring counties there has been damage done of late by mad dogs, who bit cattle, swine, etc., and communicated the distemper. A receipt for curing persons bit was reasonably published from Dr. Mead's last edition of his book on poisons, which the celebrated author says, in thirty years practice, and in above 1000 patients, he has never knew to fail of success.¹⁰

In a 1752 article in the Gentlemans Magazine there is a long quote from Mead on the success of this drug.

I can safely affirm that. . . I have never known this method to fail of success, where it has been followed before the hydrophobia began, altho' in the course of about thirty

⁷ Anonymous, " Domestic Occurances in August, 1735," Gentlemans Magazine 5 (1735): 499.

⁸ Ibid.

⁹ Anonymous, "Dr. Mead's Receipt for The Cure of A Bite of A Mad Dog," London Magazine 4 (1735): 442.

¹⁰ Anonymous, "Domestic History," Scots Magazine 10 (1748): 403.

years (besides the experience made by others both in town and country) I have used it a thousand times.¹¹

Even if these two estimates are high, one can still say Mead may have treated hundreds of suspected rabies cases. The question is how did he treat them all individually? If he did, he would have seen more suspect rabies cases than any other practitioner in England. If that was so why did Mead not write more on this terrible affliction? Probably Mead's reason for not describing more cases of rabies than he did was because he did not actually see all these cases. A reference from The Philosophical Transactions to a broadside published by Richard Mead in 1735 contained the above-noted formula. It was written:

Dampier and The College of Physicians, in their Pulvis Antilyssus, prescribe equal quantities of lichen and pepper. But Dr. Mead, in a single quarto leaf published by him Anno. 1735 hath altered the proportions of the composition prescribing double the quantity of lichen to that of pepper.¹²

This formula change was the basis of the name change from Dampier's Powders to Dr. Mead's powders. The article also noted: "This difference in the proportions must be left to the judgement of practitioners, but upon the authority of another minute in the society's journal books, it may not be improper to make an addition to the above-mentioned Dampier's Powders."¹³ Additionally, there is at the Royal College of Physicians an undated broadside entitled Curatio Certa Adversus Rabidi Canis Morsum.¹⁴

These two broadsides plus the numerous references to his cure suggests that Dr. Mead established a reputation for being able to treat hydrophobia. He may have been constantly consulted because of it. Most of these consultations could have been by mail, a factor which helps explain the 'form-receipe' for this disease that was seen in different places. But hundreds of humans bit by mad dogs? Furthermore, how does one explain the drug's success? This could be easily explained if many of the patients were not humans but dogs. More than a few of the requests could have come from the local squire whose pack of hounds was attacked by a

¹¹ Anonymous, "Some Account of The Many Methods of Cure That Have Been Prescribed For The Bite of A Mad Dog," Gentlemans Magazine 22 (1752): 33-35.

¹² Cromwell Mortimer, "Some Remarks on The Cure of The Bite of A Mad Dog," Philosophical Transactions of the Royal Society 39 (1735-36): 360.

¹³ Mortimer, 360.

¹⁴ Anonymous, "Curatio Certa Adversus Rabidi Canis Morsum ,1740s(?)" Ms, Library, Royal College of Physicians, London.

mad hound. It would not take more than a few outbreaks like this to run the case numbers up into the hundreds. In the description Mead provided for his receipe he does not specify the species of the patient; he could have been the local farmhand, the odd hound, or even the occasional milk cow or plow horse. Such cases were not uncommon; the Scots Magazine frequently noted mad dogs attacking cattle and swine while The Gentleman's Magazine and The Philosophical Transactions related numerous cases of cattle and horses being attacked by mad animals.¹⁵

Mead's medicine received a warm reception in the colonies. The first reference to it appeared in 1735 in The New England Weekly Journal¹⁶. Three years later a lengthy article in The American Weekly Mercury touted this drug's success. A gentleman known as S. M., who was from Northamptonshire, England related the case of a mad dog that had bitten two men. The first individual, the neighbor's hired man, refused all treatment and as a result died six weeks later in a miserable condition, foaming at the mouth and barking like a dog. The second individual, S. M's hired man, received Dr. Mead's cure. No symptoms of hydrophobia appeared and S. M. was convinced the drug was the perfect preventative for this disease. He wrote: "I shall be surprised if anyone should be without so valuable a receipt. . . we are willing to tell the world our case, and where those that happen to fall into such melancholy and miserable circumstances, may find certain relief."¹⁷ As late as 1770 Dr. Mead's medicine was still being touted in Colonial America as effective against the bite of the mad dog; a receipe for it was seen in The Connecticut Courant during a rabies outbreak in New England in 1770.¹⁸

It was in England that the reputation of this drug first began to fall. This was due to the fact that while the drug was a roaring success with animals, with humans it left a lot to be desired. Almost immediately after the drug was introduced there were problems. The first reference to Dr. Mead's powders being used strictly on humans comes in an article in the 1735 Gentleman's Magazine which discussed the case of William Jones, a farmer at Milton, near Wooburn, Bedfordshire, who had been bitten on the nose by a mad dog. Immediately after this incident Jones was given Mead's Powders and instructed to bath in salt water. Despite performing these two preventative measures Jones came down with, and died of, hydrophobia.

¹⁵ Anonymous, " A Probable Cure for the Bite of A Mad Dog," Gentlemans Magazine 20 (1750): 195 ; Starr, 474-478.

¹⁶ The New England Weekly Journal (Boston), 8 November 1735.

¹⁷ American Weekly Mercury (Philadelphia) 14 February 1738.

¹⁸ Connecticut Courant (Hartford), 5 May 1770.

The author explained the powder's failure by claiming the location of the bite precluded any effective treatment.¹⁹

A reference to this medicine in the same magazine two years later was anything but enthusiastic. The author spent more time talking about the care of the wound than the use of the medicine. He noted that if the wound were properly cared for, the latter medicine may not be necessary.

For as I apprehend, without regard being had to the management of the wound, all other methods will be very uncertain, if at all to be depended upon. But if proper care be taken of the wound, the method proposed by the great Doctor Mead seems unexceptionable.²⁰

Some of the most damning evidence against Dr. Mead's powders in these articles came in the form of actual documentation that they did not work. It appeared in an article in the 1737 edition of The Philosophical Transactions of The Royal Society. A surgeon named Edward Nourse detailed the case of a sixteen year old boy who in June 1735 was bitten on his right thumb by a mad dog. Nourse initially directed that the thumb be ligated and the bite wound cauterized. When such therapeutic measures were refused Nourse prescribed Dampier's powders as a suitable preventative. The medicine was taken and the youngster suffered no further effects for approximately eighteen months.²¹ Then in January 1737 the youngster complained of a numbness in the hand that had not been bit. Within 24 hours he had become feverish with generalized aches and pains. He had difficulty swallowing. The youngster was subjected to the standard eighteenth-century regimen of bleedings and purges. Despite such treatments the youngster died raving and foaming within 24 hours.²²

This case could be considered the classic description of clinical rabies except for one thing--the time between when the victim was bitten and when he died was eighteen months. Nourse himself was concerned about this extended length of time.

I was now convinced that this was the [hydrophobia?] and that it arose from his having been bit nineteen months ago. For after the most strict inquiry, it does not appear that

¹⁹ Anonymous, "Domestic Occurances, July 1735," Gentlemans Magazine 5 (1735): 386.

²⁰ P.L., "Remarks on Dr. Mead's Certain Cure for The Bite of A Mad Dog," Gentlemans Magazine 7 (1737): 691.

²¹ Edward Nourse, "The Case of A Lad Bitten by A Mad Dog", Philosophical Transactions of the Royal Society 40 (1737): 5-7.

²² Nourse, 7.

he has been bit by any animal since; and, if he had, it is very probable I should have known it, his master living next door to me, and the boy knowing how much danger we thought him in, when he was bit.²³

Nourse never assumed that other diseases: such as influenza, tetanus, or meningitis, might have caused the youngster's death. This was a reflection of the hysteria that accompanied this disease. That the youngster showed all the classical signs of rabies could easily be attributed to the indoctrinating hysteria he was probably subjected to. Considering the degree of concern expressed by all it was a miracle the youngster did not end up on all fours barking and growling like a dog. Equally, a reviewer of the 1745 edition of A Mechanical Account of Poisons showed little enthusiasm for the medicine. The reviewer does describe the production and administering of Pulvis Antilyssus ; this is followed by an even longer, more involved discussion of bathing as a remedy for hydrophobia.²⁴ All this suggests that even if Mead was enthusiastic about the drug the reviewer of his book was not.

Criticism of this drug did not lessen with time. In a 1750 article in The Gentleman's Magazine an unnamed individual mentioned in passing using Dr. Mead's powders in conjunction with mercurial ointment.²⁵ Two years later an article in the same magazine described the case of a servant who was bitten by a mad dog. The initial treatment for her consisted of seabathing and Dr. Mead's powders. In little more than a month a deterioration of the servant's condition occurred and she began to exhibit all the classical symptoms of rabies, including a morbid fear of both dogs and water. The treatment now was changed to include bleeding and liberal amounts of opium. This seemed to do the trick--she recovered completely. The author implied that Mead's powders were only effective as a preventative and that once the symptoms appeared other medicines were needed.²⁶

The 1750 Gentleman's Magazine also contained one of the strongest denunciations of this medicine. The author appears to have been well acquainted with all the remedies for hydrophobia that existed at this time. There is also some evidence that he had personel

²³ Nourse, 6-7.

²⁴ Anonymous, "A View of The New Edition of 'A Mechanical Account of Poisons' by Dr. Mead," Gentlemans Magazine 15 (1745): 255-60.

²⁵ L.W., "Treatment of the Bite of a Mad Dog," Gentlemans Magazine 20 (1750): 354.

²⁶ Christian Nugent, "An Essay on The Hydrophobia to Which is Prefixed The Case of A Person Who Was Bitten by A Mad Dog, Had The Hydrophobia and Was Happily Cured," Gentlemans Magazine 22 (1752): 303-304.

knowledge of rabies. In the earlier article he provided a very detailed account of the unsuccessful treatment of a patient: two doses of milk and cinnabar, bleed over 50 ounces, a dose of turpeth mineral with watered gruel and nitre, two glysters of nitre and vinegar, opiates, an emetic of castor and valerian, all finished off by being bled another 24 ounces.²⁷ As a result of this overwhelming, yet unsuccessful, therapeutic regimen the author decided to examine all the standard treatments for hydrophobia. The first medicine he discussed was Dr. Mead's powder. The author noted while Mead was positive as to the success of the medicine Boerhaave was equally convinced of its uselessness. He wrote: " Dr. Mead, a gentleman of undisputable veracity, and unquestionable skill, is positive as to the success of his medicine. . . nevertheless the censure of Boerhaave stands contradicted and in full force against this medicine."²⁸

He went on to say that the medicine had proved useless in clinical trials.

Dr. James in his dispensatory says he never yet knew it experienced in man. . . but has known it given to dogs, and not often with success. He has also been informed that a man near Smithfield--another at Northhampton--another at Bury, took this medicine from the first, with the utmost regularity, and yet all died mad.²⁹

He provided short clinical descriptions of four humans who had recently died of hydrophobia; included in this group was the coachman of Sir Percivall Pott, an eminent London surgeon. [This particular case had been briefly discussed earlier in the same magazine³⁰.] This discussion was used to argue against the establishment of a drug's reputation simply by word of mouth. As the author noted: "Shall any medicine used in any or all these cases still continue in credit."³¹

Another popular patent medicine was something referred to as Ormskirk medicine. It appears sometime in the early 1700s by way of a practitioner in Northern England. The

²⁷ F., " Bites of Mad Animals," Gentlemans Magazine, 20 (1750): 317-318.

²⁸ Ibid. While this author could not find anything in Boerhaave's translated works on this medicine the fact it was not mentioned in a 1755 English translation of his work on *Materia Medica* may be indicative of the fact that by this time the medicine had fallen into disrepute. See: Herman Boerhaave, Materia Medica, or, The Druggist's Guide and The Physician and Apothecary's Table Book (London: J. Hodges, 1755).

²⁹ Anonymous, Gentlemans Magazine 20 (1750): 317.

³⁰ Anonymous, "Deaths for The Year 1750," Gentlemans Magazine 20 (1750): 429.

³¹ Anonymous, Gentlemans Magazine 20 (1750): 317-318.

originator, a Mr. Hill of Ormskirk, in Lancashire, supposedly discovered a medicine that was very effective against venomous bites, especially those of mad dogs and cats. Initially it was believed the medicine was only good as a means of preventing the appearance of hydrophobia. Henry Bracken, writing in 1738, noted: "I can't say it was ever pretended to cure any one when the symptoms of madness had really seized them". Even then it was less than infallible. The medicine's lack of success appears to have gained notoriety when the Earl of Derby, in Knowsley, used it in treating some of his hounds that were supposedly bitten by a mad hound. The others received a concoction mixed up by the Earl's cook. In the end the cook proved a more successful canine practitioner than Hill; five of the nine animals who took Ormskirk powder died while all the animals that were treated by the cook survived.³²

Despite occasional failure this medicine initially had a fairly good reputation. Robert Hamilton suggested that the drug had a good overall reputation and that as late as 1785 it was still used by the residents of Northern England. Hamilton attempted to explain away its success on the basis of overdiagnosis.

Witness the prejudices in Lancashire in favor of the Ormskirk powder. I once lived there, was intimate with Hill and believe many a man might have been found, who would have received the bite of a mad dog for hire, from the belief of the infallibility of that medicine. The truth is so very few of the reputed mad dogs are really so, that any medicine, with quackery³³, may be rendered popular.³⁴

Another author based the drug's reputation for efficacy on negative evidence--he had never heard a disparaging word about it.³⁵ However, one scientist did have disparaging words about this drug, enough to conclude that, much like many other antidotes, the Ormskirk medicine was found to fail in its purpose.³⁶ Another scientist concluded that while the drug did no good

³² Bracken, 311.

³³ The term quackery refers to the way certain practitioners introduced their medicines to the public. One authority on popular medicine during this period suggests many practitioners would 'cry up their nostrums', sometimes in their presentations behaving in such a way as though they were quacking like a duck. It is from this manner of presentation that the term 'quack' is derived. See: C. J. S. Thompson, The Quacks of Old London (New York: Barnes and Noble, 1993), 23.

³⁴ Hamilton, 41, 220-221.

³⁵ Peter Beckford, Thoughts upon Hare and Fox Hunting (Dublin: T.Henshall, 1797), 120.

³⁶ Arnold, 203.

it probably caused no harm and thus should not be given up. "It is clear the Ormskirk powders are not infallible ; yet they do not hinder the use of other medicines, nor have been found noxious and should not be abandoned."³⁷

If there was some question as to the success of Ormskirk medicine there were even more questions as to its makeup. One physician noted it consisted mainly of cinnebar ; he also believed that it was probably more effective when used in conjunction with other medications. Another scientist concluded that on more than one occasion the originator of Ormskirk medicine mixed it with opiates.³⁸ The most detailed analysis of this drug was done by the physician John Berkenhout. He determined the medicine was made up of Powder of Chalk, Armenian Bole, Allum, Powder of Elecampane root and oil of Anise.

Berkenhout then went on to analyze the value of each ingredient against hydrophobia. The final results were not promising.

As to the medical virtues chalk is a mere absorbent earth, and, during effervescence produces calcaerious gas, called fixed air. Armenian Bole is nothing more than a lump of pipe clay colored with a red ochre or rust of Iron. Allum is an astringent and nothing more. Elcampane Root is said to assist in expectoration and in large doses to act as a diuretic and cathartic. It is, however, in so small a dose that it produces no effect. As to 6 drops of Aniseed Oil, I presume their efficacy will hardly be insisted on.

He noted an article which showed the Ormskirk medicine was no good. A Mrs. Bellamy who was bitten by a mad cat took it. . . and yet died of the hydrophobia about four months later.³⁹

A number of people believed one of the more effective treatments involved bleeding the patient. The justification for this practice was the effect rabies had on one's physiology. One of the greatest advocates of bleeding was Benjamin Rush. In his writings he went to great length to note the efficacy of bleeding in the treatment of hydrophobia.

The hydrophobia, like the smallpox, generally comes on with some pain, and inflammation in the part in which the infection was infused into the body, As soon as the disease discovers itself, whether by pain or inflammation in the wounded part, or by any of the symptoms formerly mentioned, the first remedy indicated is

³⁷ This suggestion that an ineffective drug should not be abandoned may in fact be alluding to the fact that in humans many cases of hydrophobia were hysterical and as such responded to placebos. See : Batt, 90.

³⁸ Barry, 31; Haygarth, 18.

³⁹ Berkenhout, 52-54.

bloodletting. . . . To be effectual, it should be used in the most liberal manner. The loss of 100 to 200 ounces of blood will probably be necessary in most cases to effect a cure. . . . The pulse should govern the use of the lancet. . . , taking care not to be imposed upon by the absence of frequency in it, in the supposed absence of fever, and of tension in the affections of the stomach, bowels, and brain. This practice, in the extent I have recommended it, is justified not only by the theory of the disease, but by its having been used with success in a number of cases.⁴⁰

Rush noted in seven cases bleeding cured patients of hydrophobia. In at least two patients had in excess of 100 ounces of blood removed during the extended period of this treatment. He went on to justify bloodletting by noting the root cause of hydrophobia was overstimulation.

There is but one remote cause of disease, and that is stimulus, and it is of no consequence in the disease under consideration whether the dread of water be the effect of the saliva of a rabid animal acting upon the fauces, or of a morbid excitement to those parts by any other stimulus.⁴¹

Other scholars and scientists did not hold bleeding in such high regard. One author observed that the practice of excessive bleeding went hand-in-hand with the belief in hydrophobia being due to excessive inflammation. He further noted in actual practice this was not confirmed.

The cases appealed to in favor of the beneficial effects of large and repeated bleedings, and consequently of inflammatory action, in hydrophobia, are so doubtful and unsatisfactory ; those, on the other hand, in which the progress of the disease was not at all arrested by the use of the lancet, are unexceptionable and decisive in the highest degree.

The uniform failure of blood-letting. . . fully authorize the conclusion that the disease produced by the bite of a mad dog or any other rabid animal is not an inflammatory disease.⁴²

⁴⁰ Rush, vol. 2, 317-8.

⁴¹ Rush, vol. 2, 320.

⁴² Pearson, 46-48.

Another physician summed up the practice and potential benefits of this practice in one sentence : "Bleeding has been performed repeatedly, and sometimes carried to an (extravagant) length, though it served to exhaust the strength and hasten the fatal period."⁴³

A far more final approach to this disease taken by some hospital attendants at the Leicester Infirmary in 1778. A fourteen-year-old boy named Thomas Nourse was taken there in November 1778 having been bitten by a mad foxhound. Despite the initial treatment Nourse's condition rapidly deteriorated. In time he became very agitated and somewhat delusional. This agitation may not have due entirely to the disease but rather to the treatment he was receiving for within hours of being admitted some of the hospital attendants attempted to kill him by smothering him under his bedclothes. The following is the description of his case:

The attending physician at 11 P. M. found half a dozen attendants trying to smother this individual under his bedclothes. He thus had all his complaints aggravated by the improper conduct of his attendants; who prompted by their fears, had almost persuaded themselves that the opinion universally received by the common people, of smothering such unfortunate objects, was not only justifiable but expedient. I found them confining the poor creature under the bedclothes ; by the united force of a half a dozen strong assistants, whose countenances bespoke the terrible apprehension they were under. He was instantly set at liberty.

The author of this case then provides what has to be the greatest understatement of the time: "The patient no longer trusted his attendants and became suspicious of all treatments, even a little frightened."⁴⁴ Such a means of dealing with hydrophobia in humans, while unusual, did occur from time to time, sometimes successfully. A 1772 case from the York Assizes noted that four people were tried for smothering a boy that had been bitten by a mad dog and had subsequently become raving mad himself. All four individuals were eventually acquitted for lack of evidence.⁴⁵

A far more innocuous treatment was sea bathing. Dating back to Roman times, bathing was initially seen as a means of dealing with the abnormal fear of water. Aetius recorded the case of the philosopher who, suffering from hydrophobia, cured himself by forcing himself into a bath.⁴⁶ By the eighteenth century the treatment had evolved from dealing with the fear of

⁴³ Fothergill, 201.

⁴⁴ Vaughan, 16.

⁴⁵ Anonymous, " Historical Chronicle," Gentlemen's Magazine 42 (1772): 386.

⁴⁶ Aetius, 287; Blasidell, Hist. Vet. Med., 1991, 23.

water to expelling the hydrophobic poison. One scientist noted that seabathing was as much a preventive as a cure.⁴⁷ Part of seabathing's success came from its shock value. One physician observed that it was believed that the shock from sudden immersion in cold water would expell the poison. He also believed salt water was better than fresh water because the salt would help to correct the virus and mundify the sore.⁴⁸

Another work examined in some detail the advantages of seabathing, including the theories behind it.

The cold bath is relied upon at present as the principal remedy in this disorder, and is used in all stages of it from the time the patients are bitten to the day of their death. . . . All the benefit is found in bracing up the habit, and taking off irritability; by means of which some few may escape the deadly effects of this poison.

The original intention of cold bathing. . . was to carry off the violent thirst, and dread of water, that the patient is tormented with in the last stage of this disorder and to act in same way, by giving a greater shock to the disease than could be done by any other means.

This author also advocated a warm bath as treatment for this disease, giving physiological justification for this measure. "The warm bath will also be of great advantage, to relax the tense skin and dilate the exhaling vessels and dispose to a free and copious secretion. . . ." He additionally noted the temperature for the bath should around 100 f and that when the patient came out he should be carefully dried and immediately put to bed.⁴⁹

The source of the belief of seabathing as a form of shock therapy probably originated with sixteenth-century Dutch medical scientists and practitioners. One author noted:

Who was the inventor of this immersion in salt water I cannot determine. I am inclined to think it originated in Holland or Flanders in the days of panaceas, charms, witches and hobgoblins. That it was a common practice in the Netherlands in the sixteenth century is evident from the writings of Van Helmont.⁵⁰

⁴⁷ Hamilton, 51.

⁴⁸ Andree, 290.

⁴⁹ Essay, 13.

⁵⁰ Berkenhout, 58.

It was also noted that Boerhaave believed the cure from seabathing was produced by the perturbation of the mind and the agitation of the animal spirits.⁵¹ This treatment may also have had a classical origin. The facing-your-fear belief may have contributed to the belief in shock therapy. Celsus believed it was very efficacious for a patient with this disease to be thrown unexpectedly into a fish pond. "If he cannot swim, he is to be suffered to flounce and drink; but if he can swim, he is to be frequently ducked, that inspite of himself he may be satiated with water."⁵² In essence Celsus says that his thirst and dread of water will be cured at the same time.

For every fan of seabathing there was also a critic. Most critics based their conclusions on numerous documented cases which indicated it did not work. One writer noted Morgagni's experience with this measure was not promising. In one case a patient was thrown into a cold bath but died of the disease anyway. Another patient, Morgagni observed, died very soon after he was taken out of the bath.⁵³ Another author noted: "Immersion into sea water has been esteemed a long time as a cure. . . but experience shows that it is not to be depended upon, many having died of the hydrophobia after having gone through this operation."⁵⁴ A third scientist, observing bathing was not a viable means of treatment, based this conclusion on the fact that many individuals who used it still died of hydrophobia.⁵⁵

Other authors were equally unimpressed. One scientist observed: " It is scarcely necessary to remark that seabathing. . . has so often been found to be of no efficacy in prevention of the disorder."⁵⁶ Another noted that four men, all bitten by the same wolf on the same day, were treated with seabathing. Despite this two of the four died of the disease. This author suggested that one use for seabathing was the supposed preservation of the individual from worms : "Although sea salt put upon the flesh preserves it from worms, it cannot be imagined that a bath used only for five minutes should penetrate into the blood, and there destroy those worms. . . ."⁵⁷ A third author could find no rational reason for seabathing, observing: " The effects of seabathing, which reason bids me expect, are by no means adequate

⁵¹ Boerhaave, Aphorisms, 1143; Berkenhout, 62.

⁵² Celsus, Lib. V, c. 27.

⁵³ Berkenhout, 62.

⁵⁴ Andree, 290.

⁵⁵ DeSault, 227.

⁵⁶ Arnold, 205.

⁵⁷ Desault, 227, 250.

to the destroying or rendering the poison inert."⁵⁸ A last scientist summed it all up when he noted : "It is scarcely necessary to remark that seabathing. . . has so often been found to be of no efficacy in the prevention of the disorder."⁵⁹

Despite its misgivings seabathing was employed in numerous cases, often with unexpected results. In one particular case, that of a young woman who was supposedly bitten by a man--this appears to be the only case in the eighteenth-century medical literature where a human was treated for hydrophobia as the result of being bitten by another human--she was directed to bath twice a day in the sea for fifteen or twenty days. She did and became so fond of it that she continued the practice for some time after the regulation twenty days. Her physician observed: "she had taken such a fancy to this bathing, that I let her use it as much as she pleased". In time she regained her full health.⁶⁰ This case is unusual not only for the supposed means of contagion but for the fact that this treatment not only alleviated an abnormal fear of water but also developed in the patient a fondness for bathing.

One of the most popular treatments for rabies for people as well as animals in the eighteenth century involved mercuric medicines,⁶¹ either as ointments or salves and as compounds that were given internally. In the sixteenth century mercuric ointments were being used to treat the primary chancres of syphilis. The explanation for the mercuric treatment of syphilis, like that for rabies, was essentially a physiological one. It was believed that mercury entered the circulatory system where, because of its great power of penetration, it would unblock capillaries, separate the blood corpuscles and grind up and destroy the syphilis poison, eventually expelling the remains via the saliva. Initially, mercury was administered for syphilis as an ointment but by the eighteenth century this was replaced by mercuric medicines that could be given internally.⁶²

Unlike syphilis, in which mercuric ointments were applied to the chancre, in cases of hydrophobia they were not applied to the wound. Rather they were used as a sort of general

⁵⁸ Hamilton, 53.

⁵⁹ Arnold, 205.

⁶⁰ Anony., " Excerpts from Mad Animals, An Easy Method of Treating Persons Bit by Them," Gentlemans Magazine 26 (1756): 567-8.

⁶¹ Anonymous, Gentlemans Magazine 26 (1756): 567-568; John Haynes, 293-301; Falkner, 222-225; Darlus, 390-392.

⁶² Claude Quetel, History of Syphilis (Baltimore: the Johns Hopkins University Press, 1992), 84-85.

ointment that was rubbed onto certain parts of the body. In one case the mercuric ointment was applied to the legs, in another it was smeared over the throat, neck, chest and abdomen. In a third case the ointment was not only applied to the body but the individual was also required to wear a mercury plaister.⁶³ Mercury was also given internally. Benjamin Rush advocated the use of calomel in the treatment of rabies⁶⁴. A more popular variety was cinnebar(HgS). One writer, Robert James, went into great detail as to this medicine's composition and use in treatment. There were two forms of cinnebar: native and factitious. Factitious was made up of three parts mercury to one part sulphur while native contained equal amounts of mercuric sulphide and musk. Musk was a substance that was almost always used with cinnebar. James believed this substance was present for certain esthetic reasons.

It was an animal substance, and consequently of an alkaline nature; and as alcalies have in all ages been recommended in this case, it seems to be at least not prejudicial, excepting in the largeness of the dose when taken in this climate, by people less used to perfumes than the orientals, who probably gave musk with the cinnebar, in order to make the medicine more agreeable.⁶⁵

Another physician noted the combination of musk and cinnebar came from Tonquin via Sir George Cobb. He further directed that this medicine be taken once in a glass of Arrack and not again for thirty days. This individual further noted that while the individuals cured or prevented from coming down with hydrophobia by the Tonquin powder were innumerable but that there were people who took it and still died of this disease.⁶⁶

The popularity of mercuric medicines was related to their causing excessive salivation. It was believed the copious flow of saliva had the desired effect of flushing out the the hydrophobic poison from the salivary glands. Benjamin Rush noted with respect to this function :

Mercury has been used to prevent this disease. There are many well attested cases upon record, of persons who have been salivated after being bitten by mad animals, in whom the disease did not show itself but there are an equal number of cases to be met

⁶³ Such a treatment was hardly unusual ; many of those who suffered from syphilis were required to wear underpants smeared with mercury. See : Arnold, 121 ; Barry, 35 ; Andree, 272 ; Quetel, 84.

⁶⁴ Rush, vol. 2, 315-6.

⁶⁵ James, 34.

⁶⁶ Berkenhout, 44-48.

with, in which a salivation did not prevent it. From this it would seem probable, that the saliva did not infect in the cases in which the disease was supposed to have been prevented by the mercury.⁶⁷

Hamilton observed:

Certain who favor this remedy, argue, on the grounds of analogy from the increased flow of saliva occasioned by it, and the same increased discharge from salival glands, always observable in persons under hydrophobia. It is supposed that nature efforts to throw off the poison by these outlets ; and that if it be assisted by mercury, there seems to be ample reason to hope for success. Another reason for giving mercury is built on the analogy of its specific powers over the venereal disease, where the poison, like that of a rabid animal, is drunk up and carried into the system by the lymphatics.

Hamilton also noted that mercury's effectiveness against venereal poison did not mean it would be effective against the hydrophobic poison. Mercury was never shown effective against the smallpox poison and might be equally ineffective against the poison of hydrophobia.⁶⁸

Probably the strongest advocate of mercury as a medicine against hydrophobia was the physician Pierre DeSault. He observed that mercury's effectiveness against crab lice, the itch, ulcers, and the King's Evil would indicate it to be effective against rabies. DeSault additionally noted: "The poison of the rabies sticks to the saliva and as mercury naturally tends toward the mouth, as experience evinces, it is not to be doubted that the sovereign antidote of so many contagious poisons should not also destroy that of the hydrophobia."⁶⁹ Another writer, James, also noted that as the poison was often found sticking to the saliva, mercury's ability to cause excessive salivation made it efficacious against hydrophobia.⁷⁰ For all the approbations there was, however, at least one voice of caution. Fothergill observed: "The extreme abuse of mercury is, perhaps, sometimes not less destructive than the disease."⁷¹ This fact is reflected in a number of cases where the patient may actually have suffered as much from mercury poison as from rabies.

⁶⁷ Rush, vol. 2, 315-6.

⁶⁸ Hamilton, 71.

⁶⁹ DeSault, 241.

⁷⁰ James, 25.

⁷¹ Fothergill, 203.

Closely allied with the use of mercury was the use of opiates. This drug was often used to deal with the excessive agitation and distress that accompanied this disease. One author observed:

Opium, known as a composer both of the mind and the body, should never be omitted in a disorder where both are so eminently agitated and distressed. It allays the spasms and therefore composes the mind. Of the few upon record who have survived this calamity, it appears opium, in one shape or other, was given to most of them.⁷²

Another writer noted that opium, like mercury, did not always live up to expectations: "Opium, whose antispasmodic powers at first sight promise so much, I found upon trial of no avail, although employed with more freedom than is commonly done."⁷³ Some individuals may have received opium as a pallative medicine which, while it did not promise to cure the disease, did help lessen the symptoms. It is well documented that, with respect to diabetes in the early twentieth century, opium was given not as an effective treatment but as a way of lessening the despair that occurred as the result of having a terminal illness.⁷⁴

The numerous clinical cases indicate that mercury and opium were not only used frequently but often to excess. Of the two mercuric poisoning was the most frequent problem. In one case an individual who had received mercury for nearly a month began to show a severe inflammation of the gums and mouth. Such inflammation had been in evidence ever since mercury was first advocated for syphilis.⁷⁵ The patient eventually became delirious and died, not of rabies but rather of mercury poisoning.⁷⁶ Far more evident of mercury poisoning are those individuals who despite showing all the supposed signs of hydrophobia-delirium or excessive salivation-eventually recover.

One such case was a Mrs. Hannah Lacase, aged 30, who was bitten in early December 1807 by a sick dog.⁷⁷ On December 15 she was treated for the bite. One of the first treatments

⁷² Nugent, 94.

⁷³ Vaughan, 47.

⁷⁴ Michael Bliss, The Discovery of Insulin (Chicago: University of Chicago Press, 1982), 23.

⁷⁵ Quetel, 84-85.

⁷⁶ Houlston, 55.

⁷⁷ The symptoms the animal exhibited : a dull and languid behavior and paralysis of the hind legs, suggested that something other than rabies was present, possibly distemper. See : Moseley, 16.

was the application of mercury ointment to the lady's throat, neck, thighs and legs. She was also given Julep and Camphor. The initial effect of all the medicines was to cause her to perspire excessively. The mercuric medicines were continued and the side effects became more serious. By December 16 the lady's breath had become offensive and her gums very inflamed, an early sign of mercury poisoning. Soon after she began to salivate excessively and to suffer from bloody diarrhea. At this point the mercury ointment and medicines were discontinued. Despite this, she still salivated excessively and suffered from sore gums until late December when the symptoms began to abate. They declined slowly and eventually ceased. In spite of all these nasty side effects the author believed this was the only case of hydrophobia, arising from the bite of a mad dog, that was successfully treated.⁷⁸

There was also the occasional case of what appeared to be opiate overdose. One such case was Hannah Springthorpe, aged 10, who was treated in the spring of 1772 for the bite of a mad dog. Starting April 3 and continuing throughout May Hannah received a full regimen of eighteenth-century therapeutics; everything from Peruvian Bark to castor oil. She also received liberal amounts of opiates in the form of Laudanum, opium dissolved in wine. The therapeutics continued in one degree or another until August when she was at declared cured. Despite this she continued to have periodic attacks of 'hydrophobia' well into 1792.⁷⁹ While the author failed to provide a description of these recurrent attacks if they were anything like the attacks seen from April to August-- nightmares, mood swings, and even occasional depression--it could easily be argued they may have been due as much to the treatment as to the disease.

Of a far more detailed nature was the case of hydrophobia in Massachusetts in 1771 noted in the previous chapter. The treatment was conventional for the times. The physician, Montagu, drew ten ounces of blood and administered ipecac and tartar emetic, drugs used to induce the patient to vomit. As a rule Tartar emetic produced more severe results than Ipecac. (Interestingly, Ipecac is still given to individuals suffering from amebic dysentery while tartar emetic is used to treat Schistosomiasis.)⁸⁰ When the stomach cramps began Montagu administered Laudanum, Salsucin, and applied hot bricks to the patient's feet. When the patient began to behave like a dog Montagu drew some 14 ounces of blood and administered calomel,

⁷⁸ Moseley, 16-21.

⁷⁹ Arnold, 1-162.

⁸⁰ J. Worth Estes, "Therapeutic Practice in Colonial New England", in Medicine in Colonial Massachusetts, (Boston: Publications of the Colonial Society of Massachusetts, 1979), 373, 378.

an extremely powerful and highly toxic purgative.⁸¹ Calomel, (mercuric chloride) is so toxic that its toxic effect was used as a method of determination as to when the patient had received enough. It was a standard rule of thumb that the patient had received enough calomel when their gums swelled and their teeth began to drop out.⁸² Calomel was not the only mercuric medicine given. Montagu also gave cinnabar, (mercuric sulfide), and turpeth mineralis (mercuric sulfate). Additionally, the patient received a great deal of laudanum.⁸³ Montagu only once deviated from his proscribed plan of treatment and on May 17 administered Dr. Mead's medicine, which was designed specifically for rabies treatment, and had the patient plunged into a river on regular intervals. This treatment had little or no effect and by May 21 Montagu was back to the regimen of opiates, bleeding and mercuric medicines.⁸⁴

In time the patient's health showed so much improvement that only Peruvian Bark, sulphur and antimony and a little opium were administered. From the end of August to the first of October he completely regained his strength and health. The patient remained in generally good health for some two or three years. Then, after a bout of heavy drinking, the attacks returned, though without the violence of the original ones. The patient was bled and given Peruvian Bark and mercuric medicines and after several weeks recovered completely. Except for occasional slight fits resembling hysteria he suffered no more problems.⁸⁵

Despite being labeled an extraordinary case of madness the fact the symptoms lasted from April to July and that the patient survived suggests the disease was not rabies. If not rabies then what affliction could have caused such prolonged problems? The prolonged symptoms may have been due as much to the treatment as any disease. The prolonged use of bleeding, opiates and mercuric compounds would have been detrimental to the health of the patient. Montagu noted as early as April 9 that his patient suffered from violent convulsions which caused his abdomen become hard as a board.⁸⁶ By the 17th of April he was suffering such severe abdominal pain and cramps that they forced him to draw his knees up to his

⁸¹ Montagu, 69.

⁸² Anonymous, " On the Use and Abuse of Calomel, " Boston Medical Intelligencer III (1826): 118.

⁸³ Montagu, 69, 70 ; Estes, 371, 373, 378.

⁸⁴ Montagu, 71-75.

⁸⁵ Montagu, 76.

⁸⁶ Montagu, 68.

chin.⁸⁷ The pain and cramps continued right up until the end of July. Equally there are references to his vomiting violently and one reference, from the 20th of July, to his having a bloody purge.⁸⁸ These symptoms could be due as much to the mercuric medicines as to any sickness. These medicines may have also had a long term effect--the occasional hysterical fits the patient suffered the rest of his life may have been due to mercuric poisoning. Additionally, there is the cumulative effects of all the bleeding and opiates--these therapies probably left the patient anemic and more than a little groggy. At one point he was described as 'a person in deep meditation with eyes fixed.'⁸⁹ Montagu believed the symptoms continued as long as they did because he was not aggressive enough in his use of bleeding, mercuric medicines, opiates and Peruvian Bark. Montagu noted: "If I had bled more freely, used the mercury more steadily, given the musk and cinnabar longer and opium more plentifully at the beginning of the disease and begun the use of the bark earlier, my patient's disorder might probably have been shortened. . . ."⁹⁰

Documented cases such as these led the scientific community to conclude that most therapeutic measures were faulty. This change in attitude gained speed during the latter part of the eighteenth century, a period during which many old measures were being discarded. Many of the scientists who wrote on the treatment of rabies after 1780 mentioned all the old methods with more than a little skepticism, due to the rise in documented cases of success or failure for the different means of treatment. In the latter half of the eighteenth century, largely as a result of more careful clinical studies, much of the therapeutics was replaced by wound treatment. Aggressive wound treatment became one of the most popular, if not the most popular, treatments. It was done mainly as a preventative to impede the spread of the hydrophobic poison. One scientist noted: "It will probably detain the poison in the wound till the eschar (scab?) separates, when it may be too late for its discharge by the succeeding ulcer".⁹¹

Wound treatments were many and varied. One scientist advocated a continual washing of the bite wound.

The plain and obvious means. . . is, first, to wipe off the spittle with a dry cloth, and then wash the wound with cold water, abundantly, and with the most persevering

⁸⁷ Montagu, 70.

⁸⁸ Montagu, 71-75.

⁸⁹ Montagu, 72.

⁹⁰ Montagu, 76.

⁹¹ Arnold, 206.

attention, in bad cases for several hours. Warm water may then be employed. . . . A continual stream of it, poured from the spout of a teapot or tea kettle is particularly well adapted to the purpose.⁹²

Another suggested burning the wound with gunpowder.⁹³ One author noted:

I would recommend . . . a dilation of the wound if small, filling it with gunpowder, and setting fire to it ; this would produce a laceration of the part, would secure a free and continued discharge for some time, and possibly the action of ignited gunpowder upon the poison may have its use.⁹⁴

Still others suggested medicines considered caustic enough to destroy the poison. One scientist suggested treating the bitten part with Lapis Infernalis and Butter of Antimony. If this was unavailable he advocated a mixture of Oil of Vitriol, Aqua Fortis, Spirit of Salt, Corrosive Sublimate, Arsenic, Brine, a strong solution of salt, a plaister of quicklime and some soap.⁹⁵ Others used antimonials and oils as caustics in the treatment of bite wounds.⁹⁶

The most promising wound treatment involved the removal of the bitten part combined with cauterization or caustic medicines. One doctor observed: "Excision by the knife of the bitten part is the only sure and certain method of prevention; and that the sooner it be done after the bit, the better; but that the practice should not be renounced even after the expiration of sixty hours, or a much longer time."⁹⁷ Another author noted the time of removal was even less: "Extirpation can avail nothing, if delayed beyond the first day."⁹⁸ A Physician described the method of extirpation:

I shall recommend a piece to be cut out round the part wounded, making the incision at the same time pretty deep, to prevent any accident from leaving any of the animal's saliva behind. The part being thus destroyed. . . the wound must be kept from healing

⁹² Haygarth, 2.

⁹³ Moseley, 30.

⁹⁴ Vaughan, 46.

⁹⁵ Moseley, 30.

⁹⁶ Nugent, 173; Fothergill, 189.

⁹⁷ Jesse Foote, A Plan for Preventing The Fatal Effects from The Bite of A Mad Dog (London: F. Becket, 1793), 5.

⁹⁸ Fothergill, 190.

either by issues, blistering ointment, or other escharotes, for several months; at least six, but still the more certain if longer.⁹⁹

Many of the physicians and scientists who advocated this method used statistical evidence to back up their claims of success. One writer noted forty people were treated with washing, extirpation and caustics and all remained alive and well.¹⁰⁰ At least two others provided lists of particular cases that were successfully treated with aggressive wound treatment. One individual noted no less than thirty-six particular cases were treated in this manner ; only one died.¹⁰¹ A third individual noted at least ten particular cases, because a result of aggressive wound treatment, never came down with hydrophobia. This same author also documented four cases of animals, all bitten by one mad dog, who did not receive proper wound treatment. Despite being given many and varied internal medicines all died of rabies within a month.¹⁰²

Those who advocated this treatment seem to have been inspired by the case of Admiral Rowley's son. Bitten by a mad dog in the fall of 1784, he died, despite many and varied treatments, of hydrophobia, in February 1785. Rowley's case was important as much for the surgeon who treated him--John Hunter. Considered to be one of the foremost surgeons in eighteenth-century England, Hunter became equally famous for his works in dentistry and veterinary science. He had a more than passing interest in rabies or hydrophobia. This is one of the few diseases involving both humans and animals that he examined in some detail. While Hunter's published works contain numerous comments on rabies these are for the most part comments of an epidemiological rather than a clinical nature. Fortunately, one does not have to depend on Hunter's own works for his work on this disease. Much of Hunter's work with rabies is reflected in the writings of his students and associates.

The first source for Hunter's comments on the clinical aspects of this disease is the students' unpublished lecture notes. Two of these are of particular interest because they contain hitherto unknown remarks on rabies. These volumes, manuscripts number 171 and 174, are found in the library of the Royal Society of Medicine. While manuscript 174 has neither an author nor a date, manuscript 171 was supposedly written by J. Melliar in 1782. As to who this J. Melliar was, there is no evidence, one cannot even be sure of the date of the

⁹⁹ Hamilton, 29-32.

¹⁰⁰ Fothergill, 193.

¹⁰¹ Moseley, 34-64.

¹⁰² Foote, 1793, 6-13.

manuscript.¹⁰³ The only thing one can say about the author of this manuscript is that his handwriting was terrible. In addition to students' notes, Hunter's experience with rabies is reflected in the writings of other medical authors, from Edward Jenner to Robert Hamilton. It is from these sources that are seen some of the more detailed descriptions of the clinical rabies.

Hunter dealt with at least four cases of rabies in humans.¹⁰⁴ The first case was not only referred to in Hunter's lectures on surgery but also in a work Morbid Anatomy of The Brain in Mania and Hydrophobia that was written by a physician named Andrew Marshal. This particular case involved an individual named Thomas Pearson who on May 27, 1787 was bitten on the hand by a mastiff. Within a day he was admitted to St. Bartholomew's Hospital where his wound was dressed with mercurial ointment. For the next four weeks Pearson, using both the ointment and taking Peruvain powder, showed no general symptoms of rabies. On June 27 he complained of pains in his shoulder, chest and head. Soon after, Pearson then experienced dizziness and a loss of appetite. Within a day he exhibited a marked difficulty in swallowing.¹⁰⁵ His throat was blistered and Tartar emetic and opium were given to him in pill form. Despite this treatment Pearson's condition steadily deteriorated until just the thought of swallowing caused him to become violently agitated.¹⁰⁶ Eventually, he suffered what appears to have been a series of epileptic fits, accompanied by hallucinations. These fits became increasingly more frequent and more severe until Pearson was no longer aware of his surroundings. Finally, after a series of particularly violent seizures, Pearson slipped into a coma and died on July 1.¹⁰⁷

¹⁰³ This author can find no reference to any J. Melliar in either The Dictionary of National Biography, Plarr's Lives of The Royal College of Surgeons or the examination book for the Royal College of Surgeons for the eighteenth century which is in manuscript form in the Royal College of Surgeons Library. Furthermore, the fact that Melliar refers to a case Hunter was associated with in 1787 is excellent evidence that the date of the manuscript, 1782, is probably in error.

¹⁰⁴ Theodorides, 152; Allen and Cooper, 146-8.

¹⁰⁵ Andrew Marshal, Morbid Anatomy of The Brain in Mania and Hydrophobia (London: S. Sawrey, 1815), 23-29 ; J. Meillar, "John Hunter's Lectures, 1782 (?)", Ms #171, p.216, Library, Royal Society of Medicine, London.

¹⁰⁶ Marshal, 37-41.

¹⁰⁷ Marshal, 43-51.

The other case involved an individual named Robertson who was bitten on the leg by a young dog. Approximately one month later he became ill with "a sickness in his stomach and a disagreeable sensation in his throat." His condition deteriorated to a point where he could not swallow. There was also a dramatic change in his mental attitude. Hunter noted: "He (Robertson) flew into passions and more readily if one desired him to drink. He became very suspicious of everyone around him." In the course of five days Robertson's condition so deteriorated that he had to be physically restrained. Hunter observed: "Of the Thursday following in the evening he was seized and carried to the infirmary at Marylebone and strapped down to the bed and begged to be left alone." There he remained until he died early the next morning.¹⁰⁸

Hunter witnessed postmortems on both Pearson and Robertson and, apart from some thickening of the epithelium of the esophagus and cardiac aspect of the stomach in Robertson, found nothing unusual in either. Hunter did consider Robertson's case important enough to take a series of pathological samples for his museum. The descriptions of these samples, along with a description of the case, made it into his museum catalogues.¹⁰⁹ What was not reported in his catalogues was that while performing Robertson's autopsy Hunter accidentally cut himself and, as was reported by his brother-in-law Everard Home, "for approximately six weeks afterwards suffered great anxiety that he too might come down with the disease."¹¹⁰

Hunter's best documented case of rabies was that of Admiral Rowley's son, a case that was singular for being well known in the eighteenth century. One author had observed that at one time or another it had been mentioned by most of the English writers on this subject.¹¹¹ The case began on December 1784 when a strange dog showed up at a house at Jermyn Street where Master Rowley was visiting. Since the animal looked undernourished plate of meat was

¹⁰⁸ L. W. Proger, ed. Hunterian Museum, Descriptive Catalogue of The Pathological Series, (London: E. and S. Livingstone, London, 1966), 177-78.

¹⁰⁹ The sections of Robertson's esophagus and stomach, labelled initially under numbers 2289 and 2290, are alas no longer in the museum, having no doubt been destroyed when the museum was bombed by the Germans in 1941. See: Sir James Paget, Descriptive Catalogue of Pathological Specimens, Hunterian Museum, 4 vols. (London: J.A. Churchill, 1871), vol. 3, 70-71.

¹¹⁰ Everard Home, A Treatise on Blood, Inflammation and Gunshot Wounds by John Hunter, 2 vols. (Philadelphia: Thomas Bradford, 1796), vol. 1, xlii .

¹¹¹ Lipscomb, 158.

provided for him which he began to eat. Unfortunately, as children are often wont to do, Master Rowley patted the animal while he was eating and was bitten on the right side of his lower lip.¹¹²

The child was immediately sent to John Hunter's surgery in Leicester Fields. Hunter treated the wound as though the dog was mad, applying a caustic that, one author noted, 'destroyed all the adjacent absorbing vessels from taking up any venom'. A Dr. Turton was then consulted and he ordered Ormskirk medicine and mercurial ointment rubbed into the boy's legs twice a day. Soon after musk medicine was also prescribed. The youngster returned to the country on December 24, in relatively good health. His lip had healed completely. Hunter had suggested that the wound be allowed to heal and that a softening agent, such as suet, oil or fresh butter, be applied to protect it from the air. He additionally wrote:

We wish, however, not to omit anything that may be necessary to prevent mischief, and could wish the musk medicine and mercurial medicine be continued under the direction of those who attend. Half a dram of the strong mercurial ointment may be rubbed in twice a day, but the gums and mouth must be watched, as we do not wish to fill the constitution pretty full of mercury. Under this idea it must be continued or discontinued, from time to time, for three weeks to come.¹¹³

Hunter suggested a prescription of musk and cinnebar should be prescribed periodically.

Soon after returning to the country Master Rowley suffered an additional accident ; a table was overturned and fell on one of his big toes, causing it to be slightly contused. About the same time Dr. Robert Hamilton was consulted and suggested continuing with the prescribed treatment. The musk and cinnebar was increased and all went well until January 12, 1785. Master Rowley then began to complain of headaches and nausea--he was also having trouble swallowing. He additionally complained of pain in his head and excessive thirst. Other physicians were sent for; they immediately bled him of 10 oz and ordered the mercuric medicines increased. By the 13th Rowley began to vomit up a viscid phlegm. Soon after he became delirious. Opiates were now given, with no effect. At 6 P.M. that evening the boy suffered a fit which left him senseless and speechless. His condition steadily worsened until he died at 11:30 that night.¹¹⁴

¹¹² Foote, *An Essay on The Bite of A Mad Dog* (London: F. Becket, 1788), 37.

¹¹³ Hamilton, 204-211.

¹¹⁴ Hamilton, 204-211.

Hunter, who did not see the youngster after he had left London, sent a letter to Hamilton about this case.

Sir;

All the means recommended were used in Master R's case. I saw him only a few hours after the bite. The lip was torn a good deal. The teeth had gone through and through and had torn out a piece. I immediately applied a caustic to every surface that I conceived had been made by the dog's teeth; I later went over them again. I am inclined to believe that I did not touch every part where the teeth had been made. He took the Ormskirk medicine. He also took musk and cinnebar and also rubbed in mercurial ointment till his mouth was sore. My whole dependance was on the caustic, but did not object to others being given. I know where there were twenty-one people bit by one dog; nothing was done for any of them and only one was taken ill. If they had all taken the medicines; then it would have been said that they only lost one out of twenty one.¹¹⁵

Hunter additionally noted in this letter a fourth case, involving a French woman who, bitten at the same time and by the same dog that bit Master Rowley, had died also of hydrophobia. The woman died some two weeks after being bitten. She did not consult Hunter until her wound had become painful. His initial examination showed the wound to be sensitive to the touch and the woman somewhat unwell. Soon after she suffered a fit similar to the one suffered by Master Rowley in the terminal stages of his disease. At this point Hunter sent for an apothecary who gave her 2 grains of opium. Some short time later the dosage of opium was increased. This occurred on a Saturday and despite the best efforts of the surgeons and apothecaries the lady died on the following Tuesday.¹¹⁶

From these cases it would appear that Hunter believed wound treatment was the primary method of treating hydrophobia and that in the terminal stages opiates should be given to lessen the fits. He used mercuric medicines and patent medicines, such as Ormskirk, reluctantly. While Hunter expresses a certain reluctance in his writings to using certain medicines he makes no comment as to their efficacy so one is left with the impression he never commented one way or another on this subject. In one set of his lecture notes, though, he concludes that, aside from wound treatment, there was no effective treatment for hydrophobia.

¹¹⁵ Foote, 1793, 38.

¹¹⁶ Hamilton, 193 ; Foote, Essay, 38.

Hunter noted: "Sea bathing has been long practiced without the desired effect, as likewise musk and cinnabar. The Ormskirk medicine is not worth anything."¹¹⁷

The fact that Master Rowley's case was so well publicized suggests that how Hunter dealt with this disease was considered important to the established medical profession. What, if any, influence did Hunter's approach to this disease have on this profession? Is there any way to gauge this influence? Probably the best way to do so is to examine the approach the Physical Society of Guy's Hospital took towards rabies treatment after Hunter's death. This society, made up of some of the foremost members of the London medical and surgical profession, had a number of members who were either Hunter's pupils or his colleagues. Thus it could be said that any medical and/or surgical approach towards rabies might to some extent mirror Hunter's beliefs.

This theory can be tested on a case of hydrophobia that was presented at the minutes of this organization on January 11, 1796 by a surgeon named Wilkinson. It involved an Hackney Coachman named John Girdler who in early November 1795 was bitten on his left hand by his own dog. The dog had shown a peculiar nature so Girdler immediately had him secured. The next day the animal escaped and was soon destroyed by Girdler's neighbors. Girdler applied to the dispensary in St. James where the attending surgeon suggested the bitten parts should be surgically removed. One finger was so badly bitten that nearly all of it was removed. The other finger suffered only a slight laceration and as such the surgical intervention was much less drastic. The individual also took Ormskirk medicine but contrary to medical advice did not apply to the wounds a caustic, a cleansing solution containing vinegar.¹¹⁸

Within two days of the surgery blood appeared under the nail of the finger that was only slightly lacerated. By December this finger had become tender to the touch. On Wednesday December 23 Girdler complained of a pain in an arm which had a recently healed fracture. The pain was soon accompanied with a general feeling of being unwell. Girdler returned to the dispensary where he was given assorted medicines. [The author of this article does not identify them by name.] The symptoms increased in number and severity--Girdler

¹¹⁷ Anonymous, "John Hunter's Lectures 1780s(?)" Ms # 174 , 324, Library, Royal Society of Medicine, London.

¹¹⁸ Wilkinson, "Medical Case with Observations, January 11, 1796" Ms, Minutes of the Physical Society of Guy's Hospital, London.

could now no longer drink or bear being in a horizontal position because such a position brought on a feeling of suffocation.¹¹⁹

By December 24 Girdler became highly agitated and somewhat delusional. Simple movements upset him greatly and he could no longer stand to look at any fluid or a lucid body. He believed fluid was now oozing from his throat and was continually rubbing it with his hand. he became so agitated that he insisted on being put into a strait jacket. Convulsions began to occur, very quickly they increased in such frequency and degree that restraint was required. He had not had anything to eat since the 23rd. Then on the morning of Saturday December 26 he drank more than a quart of tea and ate a large slice of bread. By 8 o'clock Girdler became much more composed. Opium was now given and mercurial ointment rubbed in the bite wounds--apparently for the first time. Soon after Girdler slipped into a coma and died.¹²⁰

Following the discussion of this case a number of treatments are suggested. First and foremost, the extirpation of the bitten part was advocated. Wilkinson also believed mercury ointment was an efficacious remedy. He noted earlier physicians had treated more than three hundred individuals bit by mad animals this way without a loss. Other members, though, believed the ointment to be less than effective. They suggested bleeding followed by musk and opiates. Wilkinson himself had a low opinion of this treatment. He noted: "I have lately heard in one case this medicine has been given the fairest trial without any apparent benefit."¹²¹

Wilkinson seems to have had the highest opinion of excision as treatment. He noted:

From the particulars I should be induced to suppose that when it is ascertained that a person has been bit by a mad animal the best means of cure is extirpating the infected part if practicable ; if not--as when in the face or in one case of Cline's in the eyelid--cautery or a caustic alkali should be recommended.

Wilkinson appears to have practiced what he preached. With respect to Girdler the main means of therapy was the aggressive treatment of the bite wound and only when this case reached the terminal stages were opiates suggested. Why the mercuric ointment was applied in the latter stages of the disease cannot be determined. Wilkinson did note that at the time of his death Girdler's bite wounds were generally healed.¹²²

¹¹⁹ Wilkinson, Ms, January 11, 1796.

¹²⁰ Wilkinson, Ms, January 11, 1796.

¹²¹ Wilkinson, Ms, January 11, 1796.

¹²² Wilkinson, Ms, January 11, 1796.

It is easy to speculate how much influence Hunter's method of treating rabies had on the medical practitioners who were either his students or his colleagues. What can be said is that by the late eighteenth century many of the prominent medical and surgical practitioners were relying primarily on extirpation of the wound as a means of treating this disease. This approach seems to have been based largely on the enormous amounts of clinical data that were available at this time.

If the large amounts of clinical data had influence on treatment it had almost no influence on the eighteenth-century attempts at prevention. That does not say the attempts at prevention were not subject to any influence--in fact it was here more than anywhere else that influence was felt. The influence often had negative ramifications. At much the same time as the Physical Society of Guy's Hospital was discussing the case of John Girdler Parliament was attempting to prevent rabies by controlling the stray dog population in London and beyond. This measure, though, ran counter to a social phenomenon occurring in eighteenth-century England--the emotional, highly sentimental relationship that was developing between the average Englishman and his dog.

CHAPTER 8: THE PROBLEM OF PREVENTION OF RABIES IN THE EIGHTEENTH CENTURY

In the eighteenth century dogs, especially stray dogs, were seen by many as a potential source of disease. It was believed that limiting the numbers of these animals helped control the spread of certain afflictions. The idea of controlling the number of stray dogs was hardly new in the eighteenth century, especially in London. There are numerous records from the sixteenth and seventeenth centuries of such attempts. The main concern at this time was the dog as a spreader of plague; it was believed that the contagious matter attached itself to the animal's coat, thus allowing the dog to spread the disease. In 1563 a severe outbreak of plague prompted a number of London parishes to order the killing of all dogs. The churchwarden's accounts of Westminster Abbey note a bounty of 1d was offered for each dead dog. It was specified that only certain individuals could perform this deed: "The iiii of August was anodur proclamassyon from my Lord Mare that ther ys on man hyred (to kill) doges, as many as he can find in the stretts."¹ There is additionally an undated reference from the Westminster Church accounts to one John Welsh who was paid 3s. 2d. for killing and carrying away dogs during an outbreak of plague.²

During a 1665 outbreak of plague the parish of Westminster employed a dog killer at a rate of 1d. per dog and 1/2 d. per cat. For killing 61 animals in one week the dogkiller was paid the sum of xiiis.xd. In time this individual had killed more than 300 dogs and cats.³ Either there was an immense number of stray dogs and cats in London or these individuals were

¹ Rev. Mackenzie Walcott, M.A., Westminster Memorials of The City, Saint Peter's College, The Parish Churches, Palaces, Streets and Worthies (London: J. Masters, 1849), 154; John Smith, F. S. A., A Catalogue of Westminster Records (London: Wightman and Sons., 1900), 38.

² Smith, Westminster, 49.

³ Smith, Westminster, 105.

killing more than strays. A statement from the records of the Common Council of London suggests that the latter was the case. The following ordinance was issued on July 1, 1665.

For as much as now of late ye plague is somewhat. . . within this city and liberties thereof and for yt ye great number of dogs kept and suffers to run abroad in ye streets and kept in man's houses is thought to be so dangerous and a great [means]? for suppressing of the said infection that are in ye King's [?] to charge and demand ye beadle of ye ward and constables of each parish to give notice to every household in ye said wards before thursday that they kill or avouch forth of their houses in city and thereof all those dogs of what sort or kind. They shall be killed by officers appointed.⁴

Obviously dog owners had a choice--either kill their animals or remove them from London. For the most part the latter action was taken.

With the disappearance of the plague the practice of killing stray dogs appears to have fallen into disuse. There are no more references to such practices in London until the middle of the eighteenth century. This does not appear true in other cities in the British Isles. In 1738, in response to a mad bulldog running amuck, the Magistrates of Edinburgh issued a proclamation ordering all dogs in the city to be either removed or destroyed. No one was to keep a dog there for the next thirty days. The city treasurer was also empowered to pay 1s. for each animal killed. Many of the animals were clubbed to death, others were herded into the harbor and drowned. Overzealous civil servants combined with the bounty led to the killing of not only strays but working dogs and even the pets of the gentry. Among the animals that fell victim to this action were dogs "that lead the blind about the streets", an early reference to self-trained seeing-eye dogs.⁵

This indiscriminate slaughter did not go unnoticed. One individual took strong issue with these actions. He wrote that the date of the issuing of this order--April 8, 1738--would in time become as memorable as the date of the Saint Bartholomew's Day massacre. This author believed the bounty for these animals contributed to their slaughter: "I suppose it was the love of filthy Lucre that made them so bloodthirsty". He also noted that he had been fortunate enough to save an animal named Caesar from the killers. This individual wrote an essay on this animal's positive qualities: "In short he (Caesar) is a brave, quiet, sagacious companion and I

⁴ "Proceedings of Common Council, July 1665" Ms, Corporation of London Record Office, London.

⁵ Anonymous, "Historical Chronicle," Gentlemans Magazine VIII (1738): 219.

have known walk upon two legs with not half his capacity."⁶ These comments set the tone for future responses to such practices; it was seen as greedy men engaging in the brutal and indiscriminate killing of man's best friend. The evidence, though, suggests that such killing was anything but indiscriminate and that from time to time the individuals doing the killing could be subjected to legal action if they got out of hand. Probably the best evidence for this comes from the documentation for an outbreak of rabies in England in 1760; in London it led to attempts at controlling the dog population by killing only the strays.

The epidemic first appeared in the early spring. One newspaper article noted that early in March a mad dog had gone on a rampage near Tottenham and Waltham and had bitten at least twenty humans and a large number of dogs before he was killed.⁷ In early April at least seven dogs had run mad near Eltham in Kent.⁸ By April 9 mad dogs near Folkstone were causing great concern. The author who mentioned this also provided a less-than-pleasant foreboding of the near future: "There is great reason to fear that many dogs that have been bit are now dispersed about the country."⁹ At the end of April Worcester was suffering with mad dogs. Not only dogs but also humans and other animals fell victim to this terror. In nearby Kidderminster a mad dog bit several humans, a horse and a cow; the humans received treatment in the form of seabathing while the animals were destroyed. At this point the first preventive measures are seen. In Worcester the Mayor and the justices of the peace ordered all residents to confine their dogs for an indefinite period of time. Moreover, if their animals were bitten by strange dogs they were to be observed very closely and immediately destroyed on the first signs of madness.¹⁰

The first evidence of this affliction occurring in London was a notice of a mad dog biting several people in Lincoln's Inn Fields on the first of May.¹¹ Soon after articles appeared outlining an "infallible" diagnostic test for rabies that involved a suspected dog, bread and a healthy dog.¹² Meanwhile notices of mad dogs attacking animals and humans continued; some

⁶ Humphrey Ambler, "The Reveur," Gentlemans Magazine VIII (1738): 237-40.

⁷ Universal Chronicle (London) 8-15 March 1760.

⁸ Universal Chronicle (London) 29 March-5 April 1760.

⁹ Whitehall Evening Post (London) 8-10 April 1760.

¹⁰ Whitehall Evening Post (London) 24-26 April 1760.

¹¹ Whitehall Evening Post (London) 1-3 May 1760.

¹² Whitehall Evening Post (London) 10-13 May 1760; London Evening Post (London) 12-15 July 1760.

cities, such as Hackney and Salisbury, reported a number of such animals.¹³ Even the intimate circle of Royalty was not immune. Thomas Boulton, one of the master cooks to his majesty, suffered from one of these attacks in late June but survived.¹⁴

By mid-July the disease appears to have reached Oxford. There, in response to attacks by several supposedly mad dogs, the Vice Chancellor and the Mayor ordered that all persons within the precincts of both the university and the city confine their dogs for two weeks. In August the reports of cases continued to come in. In the early part of that month a hogkeeper who lived in Katherine Wheelyard, St. James, reported he had to destroy several of his hogs after they had been bitten by a mad dog.¹⁵ More than just swine were being attacked; a coal merchant named Wood, along with two other individuals, was bitten by a dog in Hartshorn lane while a woman in Limehouse and a boy at Georgeyard on Lombard Street were also bitten by mad animals.¹⁶ In the middle of August a Westminster coal merchant's son, his ostler and a horse were all bitten by a family dog which was suspected of being rabid.¹⁷ Later that month a dog used to turn a cooking spit turned mad instead and bit a sailor, a boy and several pigs before he was killed. At least one newspaper noted this particular incident caused great concern among others who employed dogs in this manner.¹⁸

Along with the mad dogs came the hysteria of rabies; this led to more than a few cases of hysterical rabies. In one case a bookbinder named Marriot was bitten on a Thursday by a carpenter's dog. By Saturday he had begun to show signs of madness, a period of incubation far too short for rabies.¹⁹ A far more sensational case was that of a customs official named Hedgabout who was bitten on the nose and hand by his own dog. It was reported that very soon after the animal exhibited many of the signs of rabies. Despite treatment by two eminent physicians the symptoms of madness appeared. Eventually, convinced of a horrible death, Hedgabout supposedly took matters into his own hand and arranged for his suicide. This was done by a surgeon bleeding him to death, which might make it one of the documented earliest

¹³ Whitehall Evening Post (London) 15-17 May ; 14-17 June 1760.

¹⁴ Whitehall Evening Post (London) 28 June-1 July 1760.

¹⁵ Whitehall Evening Post (London) 9-12 August 1760.

¹⁶ Whitehall Evening Post (London) 21-23 August 1760.

¹⁷ Whitehall Evening Post (London) 16-19 August 1760.

¹⁸ Whitehall Evening Post (London) 26-28 August 1760.

¹⁹ Whitehall Evening Post (London) 16-19 August 1760.

physician-assisted suicides.²⁰ The only problem with this story is it never happened!!! The London Evening Post in its August 23-26 edition issued a statement that there was no foundation that Headgabout had ever been bled to death by a surgeon. The lack of an obituary for this individual for either August or September suggests he probably did not die of rabies.²¹ He may not even have been exposed to the disease.

There were enough who supposedly did, to keep the hospitals busy. By August 23 it was recorded that the Westminster hospital had treated at least seven humans who had been bitten by dogs.²² Such evidence would suggest that the disease was rampant and was causing many people to seek medical treatment for mad dog bite. In the eighteenth century, though, not all cases of dogbite treated in London hospitals were seen as potential cases of rabies. The St. Thomas Hospital patient register for the 1780s noted that at least two individuals--James Stanley and James Brown--were admitted after having been bitten by dogs. In neither case is there any mention of the animals who did the biting being mad.²³

From the Middlesex Hospital Records for the 1760s there are three cases in which patients were treated for dog bite. The first, from October 1, 1763, involved Edmond Grove who was treated for a dog bite on the hand. He remained in treatment for eleven days until he was declared cured by his surgeon. The second, from October 8, 1765 involved one Walter Carr who was also being treated for dogbite. He was declared cured on the 22nd. In neither case was there any reference to the animal being mad. The last case, from December 24, 1765, involved a John Rivers who was treated for the bite of a mad dog, the only one of the three in which the animal was considered rabid. There is no remark as to when he was declared cured but he appears to have remained in the hospital for two weeks because on January 7 it was noted he was now being treated as an outpatient.²⁴

An indicator of the seriousness of this epidemic was the number of people who went to Gravesend to swim in the sea. Since seabathing was one of the most strongly suggested treatments for hydrophobia, it was believed by some that the large number of people engaging

²⁰ Whitehall Evening Post (London) 21-23 August 1760; London Evening Post (London) 21-23 August 1760.

²¹ London Evening Post (London) 23-26 August 1760.

²² Whitehall Evening Post (London) 26-28 August 1760.

²³ "St. Thomas Hospital, In Patient Registers, Admission Records 1780-87" Ms, Greater London Public Record Office, London.

²⁴ "Middlesex Hospital, Records of Inpatients, 1760-66" Ms, Middlesex Hospital, London.

in seabathing at Gravesend was an accurate reflection of the extent of this disease among the population. At least one journalist pointed out that this was not always the case. Seabathing was generally seen as therapeutic for weak and broken constitutions as well as for the bite of a mad dog. Thus the large number of individuals swimming in the sea at Gravesend was not a reflection of the number of people bitten by mad dogs.²⁵

By August the disease was well enough established in London to bring responses from the civil authorities. In one such response, occurring around August 7, the Lord Mayor issued an order to the constables of several wards to give notice that all dogs were to be confined in their owner's houses for a period of two months.²⁶ Additionally, a number of parishes also attempted to deal with this outbreak. The parishes of Battersea, St. Martins, Ludgate, St. Vedast Foster, St. Michael Le Queen, St. Johns Horselydown, St. Olave, St. Savior, St. Thomas and St. George The Martyr issued orders for the parish members to confine their animals for two months. The Archbishop of Canterbury also became involved; he ordered all dogs in the parish of Lambeth to either be confined or removed to another parish.²⁷ Arrangements were made by both the secular and the ecclesiastical authorities to deal with the strays.

By August 26 the situation had become so serious that the municipal government of London took action. A notice from the Common Council of London outlined the following ordinance.

Resolved and ordered, that public notice be given. . . that if any dog shall be found in the streets or highways of the city of London after Wednesday the 27th for the next two months the constables, beadles, watchmen and other ward officers shall be directed immediately to kill such dog and this court will indemnify and save harmless all persons killing such dogs. The constables and beadles of the several wards shall be entitled to and receive two shillings from the deputies of the wards for every dog killed and buried, the skin being first slashed in the body. This court doth give leave to all persons whatsoever to bury dogs on the occasion in the two farthestmost quarters of Moorfields from Bethlam.²⁸

²⁵ London Evening Post (London) 21-23 August 1760.

²⁶ Whitehall Evening Post (London) 5-7 August, 7-9 August 1760.

²⁷ Whitehall Evening Post (London) 23-26 August, 26-28 August 1760.

²⁸ "Minutes, Common Council of London, August 26, 1760" Ms, Corporation of London Public Record Office, London.

This ordinance was repeated almost verbatim in a number of London newspapers as well as in the Annual Register²⁹ and versions of it were issued in other municipalities. In other towns and cities attempts at animal control mirrored those of London. In Salisbury, Monmouth and Edinburgh orders were issued on September 8 for all persons to confine their dogs and for the local authorities to destroy all unconfined animals.³⁰

In London the attempts at animal control proved to be neither kind nor gentle. For example, in Bridewell former soldiers went on a dogkilling spree in which fourteen or fifteen of these animals were left dead in the streets. Eventually their carcasses were dumped into the Fleet Ditch.³¹ Several animals were killed around Tyburn Lane and St. James Park while at least twenty were destroyed in the vicinity of the Tower of London.³² In some cases their carcasses were thrown into the ditch that surrounded it. One witness observed: "No less than the bodies of 30 dead dogs were (put there) in one day."³³ Much of the dog killing was indiscriminate. For example, on August 26 a supposed mad dog bit several of his canine associates in Blackman Street; at much the same time another dog bit two humans in Long Lane. Since both incidences occurred in Southwark this resulted in the neighborhood authorities rounding up and hanging many dogs, few, if any, of which were involved in these attacks.³⁴

It became obvious that dog killers occasionally engaged in actions that could easily lead to a day in court, both civil and/or criminal. Occasionally individuals other than dogs were injured by the dog killers. A public house owner named Masters was attempting to deal with a particularly aggressive dog when four other men appeared and began to beat him badly. The record does not say whether these men were coming to the rescue of the animal or whether they wanted the carcass for themselves but considering the bounty the latter was probably true.³⁵ Other times people were injured when the dog killers threw the remains of these animals at passerby's. After a slaughter of strays at Moorfield the dog killers threw the dead animals at

²⁹ London Evening Post (London) 26-28 August 1760 ; Whitehall Evening Post (London) 30 August-2 September 1760.

³⁰ Whitehall Evening Post (London) 6-9 September, 9-11 September 1760.

³¹ Whitehall Evening Post (London) 23-26 August 1760.

³² London Evening Post (London) 7-9 August, 9-12 August 1760.

³³ Anonymous, "Historical Chronicle," Gentlemen's Magazine 30 (1760): 392.

³⁴ Whitehall Evening Post (London) 26-28 August 1760.

³⁵ Whitehall Evening Post (London) 23-26 August 1760.

men, women and even children. One young woman with a child went into a series of fits after being hit by one of these carcasses.³⁶

Another man in Cheapside, attempting to kill a dog with a club, missed the animal and broke a number of windows of a tradesman instead. The aforementioned individual was immediately taken into custody and held there until all the damages were paid for.³⁷ Probably the most prominent case involved a gentleman who was walking through Houndsditch with a dog on a leash when he was attacked by a local shopman. The individual went to strike the animal with a club but missed and instead struck the gentleman, breaking his arm badly.³⁸ The newspapers who reported this incident noted its possible legal ramifications.

It is likely to work for lawyers, as the City of London cannot bear harmless the wretch that broke the man's arm by missing his blow at the dog. The order of the Common Council impowers only constables, beadles and watchmen to kill all straggling dogs they find. It does not commission the rabble, or any other persons to do it. Moreover, a dog led along the street in a string or chain, is, in the eye of common sense, deemed the same as if tied up at home. Therefore there may be two actions taken against the officious barbarian, one for an assault with an intent to destroy the gentleman's property and the other for breaking the man's arm who had the property under his care.³⁹

Unfortunately no names were used so it cannot be determined if such legal actions were taken. What is evident is that, at least with respect to the bounty on dead dogs, the ordinance issued by the Common Council was often ignored. Individuals other than constables, beadles or watchmen were often compensated for dog killing; in one case three chimney sweeps were paid one half crown, a shilling and sixpence for their dog killing efforts. This payment produced a quarrel as the sweeps could not decide how to divide up their bounty.⁴⁰

As summer moved into fall the disease became less evident. The lingering hysteria was still present and appears to have been responsible for a late misdiagnosis of this disease. It was initially claimed that the deaths of five horses owned by a Mr. Dodington were from rabies.

³⁶ Whitehall Evening Post (London) 26-28 August 1760.

³⁷ Whitehall Evening Post (London) 30 August-2 September 1760.

³⁸ Whitehall Evening Post (London) 2-4 September 1760.

³⁹ Whitehall Evening Post (London) 4-6 September, 6-9 September 1760; London Evening Post (London) 4-6 September, 6-9 September 1760.

⁴⁰ Whitehall Evening Post (London) 2-4 September 1760.

Later investigations found this claim to be without foundation.⁴¹ The comments about Dodington's horses marked the end of this outbreak. By September it had largely disappeared from Plymouth and by October from the rest of England. How much the preventive measures contributed to rabies being brought under control can not be accurately determined. What is evident is that the dog killing, far from being wholesale and indiscriminate, was very selective. Only stray dogs were generally killed, dogs on leashes, with collars or within houses were as a rule exempt. An excellent example of this is that throughout this epidemic an unnamed gentleman rode around town in a miniature coach pulled by four dogs; he even gave rides to children for a penny a piece. During this whole period the only complaints heard about him were about his reckless driving.⁴²

As the concern about the disease lessened a number of individuals reflected upon it. One medical writer, Daniel Peter Layard, believed that eating corrupted food had the potential for causing madness in dogs. He noted as an example that 1760 was renown not only for madness in dogs but also for a fever among humans, a fever caused by putrefacted material.

The winter of 1759 was mild; the spring of 1760 very foreward; during the whole summer myriads of insects were seen, especially in pools of stagnating water. The summer being dry the cattle were forced to drink from these pools. In the autumn there arose putrid fevers, of such a malignant nature as to be little inferior to pestilential distempers. Persons were carried off in three-nine days with the most violent marks of malignity and putrefaction.

The brute creation were also liable to such illness. . . especially if their food was corrupt, which dogs are known to feed upon of choice. The offals. . . the stinking waters. . . and perhaps, even the want of water, in many places, might cause this madness among the dogs.⁴³

This same concern for putrefaction was brought up with respect to the dead dogs being dumped in Tower ditch. One author who observed this practice felt that such number of dead animals could lead to outbreaks of disease. "The putrefaction of animal flesh is known to be productive of the very worst distempers. . . . Should any infectious disease take its rise from

⁴¹ Whitehall Evening Post (London) 13-16 September 1760; London Evening Post (London) 13-16 September 1760.

⁴² Whitehall Evening Post (London) 9-12 September 1760.

⁴³ Layard, 120-121.

this hasty order for the indiscriminate destruction of dogs, would not the Magistrates be highly blameable?⁴⁴

Despite the rather selective nature of animal control a number of individuals took issue with the dog-killing. One writer noted this practice was anything but effective in dealing with rabies. "Of the dogs that will be massacred. . . not one in one thousand will be mad, and of those that are mad, not one, perhaps, will be killed. Those who make it a revenue to kill the dogs will carefully avoid meddling with any that have bad symptoms, from the dread of the consequences."⁴⁵ Another author observed the reward, in part because it encouraged indiscriminate killing, caused more trouble than it solved.

This reward prompted a licentious rabble to kill every dog they could meet, within their reach, with all the barbarity possible. And too often the number of real mad dogs increased by the violent pursuits and attacks of the giddy and unthinking populace. Therefore, it must be plain that as there was sufficient cause in that hot season, to produce. . . madness among dogs ; so their number were multiplied by the barbarous usage they met with. Even all these added, fell far short, in number, to those who were killed through wontonness and without reason.⁴⁶

A third author believed that the fear of the disease was far worse than the disease itself. "A dread of mad dogs is the epidemic terror which now prevails, and the whole nation is at present groaning under the malignity of its influence." He also observed that since it was almost impossible to determine scientifically if an animal was mad, superstition and folklore often superseded scientific opinion. "The manner of knowing whether a dog be mad or no, somewhat resembles the ancient custom of trying witches."⁴⁷

The problem of inaccurate diagnosis also surfaced in a later article on the same subject. The author suggested that, rather than killing the animal, they should be confined to determine whether these animals had the disease. Positive determination could only be made if the animal died of this affliction. "Many persons who have been bitten by dogs, have lived long under great anxiety, in apprehension of their being mad, no proof to the contrary being possible when the animal is immediately killed. It is therefore little less injurious to society to destroy a dog

⁴⁴ Anony., Gents.Mag. 30 (1760): 392.

⁴⁵ Anony., Gents.Mag. 30 (1760): 392.

⁴⁶ Layard, 121.

⁴⁷ Anonymous, "On the Prevailing Rage of Dog-Killing," Gentlemans Magazine 30 (1760): 353.

suspected only of madness than to save one that is really mad."⁴⁸ Another author provide an illustration of how fear of mad dogs could get totally out of hand.

A lady in the country, of very weak nerves, has been frightened by the barking of a dog; the story spreads that a mad dog had frightened a lady of distinction; in the neighboring village the report is that a lady of quality was bit by a mad mastiff. This account gathers new strength, and grows more dismal as it approaches the capital, and by the time it has arrived in town, the lady is described with wild eyes, and foaming mouth, running mad on all fours, barking like a dog, biting her servants, and at last smothered between two beds.

Were most stories of this nature thoroughly examined, it would be found that numbers of such as have been said to suffer, were no way injured, and that those who have been actually bitten, not one in the hundred were bitten by a mad dog.⁴⁹

Another writer compared the loss from rabies to the value from the services of dogs. "Even allowing three or four to die in a season of this terrible disease yet still it is not considered how many are preserved in their health and property by this devoted animal's service. The midnight robber is kept at a distance, the healthful chase repairs many a worn constitution and the poor man finds in his dog a willing assistant, eager to lessen his toil, and content with the smallest retribution."⁵⁰

Not all articles took issue with the practice of dog-killing. One author noted:

Many complain of the hardships dogs suffer through the order of the Lord Mayor. As it is for so short a time, it might have been reasonably expected every owner of a valuable dog would have readily confined himself to it, to secure his dog from the danger of being bit by the many that go mad at this time. And some there are who allege such order is unnecessary, as they say not above two persons in the Bills of Mortality have died mad this year from the bite of that animal ; but would such make the case of

⁴⁸ Anonymous, "Observations on the Late Clamour against Dogs," Gentlemans Magazine 30 (1760): 465.

⁴⁹ Anony., Gents.Mag. 30 (1760): 354.

⁵⁰ Anony., Gents.Mag. 30 (1760): 392.

numbers that are bit their own, they would not be against the destruction of the useless ones of that species, which are continually found strolling about.⁵¹

This author echoed the thoughts of many at this time--the best way to deal with rabies was to eliminate, or at least severely limit, the stray dog population. Allowing a bounty for dogs killed was not the means of doing it. In the wrong hands it proved both cruel and very indiscriminate; sometimes the killers, in an effort to get at the dogs, even assaulted the owners. A far kinder and gentler means of control was to impose a tax on these animals, thus making their ownership beyond the financial ability of the poor. Talking about a dog tax and getting it through Parliament however appeared for a time to be almost exclusive of each other. It would more than thirty-five years from the 1760 outbreak before such a tax became law and it would be repealed within two years.

There had been medieval attempts at taxing dogs. One of the earliest references to such a statute comes from the reign of Richard II. Introduced in 1387, the tax was aimed at working animals; a clause included with this law excluded pet dogs.⁵² In 1476, during the reign of Edward IV, an ordinance was passed by the Common Council which imposed a fee on dogs.

That no person hold nor have a dog or dogges nor sauv to biche usying to go at large out of his cloise or keyping by day nor by nyght within the Fraunchese of this citee except gentil hounds and bockers dogs being no sauite biche to the which it shall be letfull to go at large by day and not by nyght uppon payne to pay XLd. to thuse of the chambre of every dogge or sauite biche going at large contrary to this acte.⁵³

That such ordinances first appeared in 1387 and were largely repeated in 1476 suggests that even at this early date there were numerous attempts to deal with a stray dog population.

One of the first references in the eighteenth century to a dog tax is seen in a 1750 article. The author, one Robert Hermitt, believed that such a tax was important for two reasons: the preservation of wild game, such as pheasants and rabbits, and the problem of mad dogs. With respect to the latter he wrote: "that dreadful calamity is generally spread through the country by snarling curs, with which every village swarms; there was lately no less than ten bitten by one mad dog."⁵⁴ Hermitt felt the tax should be directed at the numerous useless

⁵¹ Whitehall Evening Post, 30 August-2 September 1760.

⁵² Reginald R. Sharpe, D. C. L., ed., Calendar of Letter Books of The City of London, London: R. Clay and Sons, 1912), Letter Book H, p. 311.

⁵³ Sharpe, Letter Book L, pp. 130-31.

⁵⁴ Robert Hermitt, "Dogs to Be Taxed," Gentlemans Magazine 20 (1750): 38-39.

animals seen in every town and city:"Throughout the whole country in general, if there is one dog kept for any real use or service, there are forty which are only a nuisance to their neighbors and injurious to their owners."⁵⁵ He noted such a tax would be helpful because it would eliminate numerous dogs from the poor, who, when rabies struck, were less able to deal with the crisis.

Gentleman's dogs are seldom suffered to run at large, if any of the dogs show any symptoms of madness, they (the gentry) will have them confined with more prudence than can be expected from the common people in this case. Many mischiefs may be prevented by a law which would prevent the common people from keeping such numbers of useless curs; gentlemen will not be unwilling to pay for a certain number of dogs kept for their diversion, I hope the ladies' lap-dogs will be excused, as they are pretty innocent animals. . . .⁵⁶

Hermitt's remarks set the stage for the justification for such a tax--too many useless dogs were being kept by poor people who were incapable of caring for them. Seven years later another writer, known only as Colonus, also wrote on the utility of such a tax. He observed: "If the number of dogs was reduced, the poor rates would also be reduced, and we should not behold so many shocking scenes of misery, as we hear of almost every day, from the bite of those brutes."⁵⁷ After the outbreak of rabies in 1760 the cries for a tax on dogs became more pronounced. One writer noted: "The propriety and utility of a tax upon dogs was plainly demonstrated a little more than a year ago, when His Majesty's subjects in general were terrified and many of them bit by mad dogs. . . . Such a tax would undoubtedly lessen the number of dogs, and thereby the various mischiefs arising from them would be lessened likewise."⁵⁸

For all the public demand the early attempts at passing such a law proved unsuccessful. In February 1755 a bill was introduced to the House of Commons for just such a tax. The bills 'raison de etre': "To avoid and prevent inconveniences, damages and mischiefs occasioned by the multiplicity of useless and unnecessary dogs", suggests this legislation was directed mainly

⁵⁵ Hermitt, 38-39.

⁵⁶ Hermitt, 38-39.

⁵⁷ Colonus, "Utility of A Tax Upon Dogs," Gentlemans Magazine 27 (1757): 159.

⁵⁸ Publicola, "Tax Proposed on Dogs," Gentlemans Magazine 32 (1762): 21.

towards the poorer classes.⁵⁹ It was reintroduced on February 24 and at that time the Commons resolved that it be read again, which it was on March 3. The bill was then committed to the Commons for further consideration.⁶⁰

By then petitions began to arrive from counties such as Warwick, Somerset, Northampton, Norfolk, Suffolk, Lancaster and Leicester demanding that such a tax be made law. Most of these demands came from farmers and cattlemen complaining about the damage done to their herds and flocks by dogs. In at least one case concern for contagious diseases was expressed as reason for this tax. In a petition from the residents of Norfolk noted: "The bites of mad dogs are now become more frequent than ever, and there is a great reason to apprehend, that the infection and pestilential diseases, now raging amongst the horned cattle, are extended by means of such animals."⁶¹ In late March the House agreed to set up a committee to examine this bill; Sir John Glynn was appointed its chairman. Established on March 19 the committee met on the 26th, April 3 and April 5. On the last day, though, an insufficient number of members forced the cancellation of the meeting. After that the bill quietly disappeared from the Commons' agenda.⁶²

Four years later a bill was introduced outlawing the stealing of dogs. It was first introduced on April 5, by the 25th a committee was established to deal with it. This committee had at least 53 members, nine of whom were titled gentry. On May 7 Sir William Codrington reported on several minor changes; very soon after a revised bill was resubmitted. On May 9 it passed the Commons with a vote of 33 for to 26 against and was sent on to the House of Lords.⁶³ Obviously concerns about the theft of these animals was serious enough to get such a bill through Commons in one month. As to who expressed this concern one can only surmise; the fact, though, that numbers of the upper middle class had enough emotional attachment to

⁵⁹ "Anno 28, Georgii II, February 19, 1755" in Journals of The House of Commons 27 1754-55 (London, 1803; reprint, New York: Microprint Edition, 1964), 165 (page references are to reprint edition).

⁶⁰ "Anno 28, Georgii II, February 24, March 3, 1755" in J. House Com., 27, 1754-55, 174-186.

⁶¹ "Anno 28, Georgii II, March 3, 1755" in J. House Com., 27, 1754-55, 186.

⁶² "Anno 28, Georgii II, March 14, 19, 26 . April 3, 5, 1755" in J. House Com., 27, 1754-55, 231, 246, 267-8, 272, 274.

⁶³ "Anno 32, Georgii II, April 5, 12, 25, May 7, 9, 1759" in J. House Com., 28, 1758-59, 534, 546, 559, 569, 574, 579.

their dogs to offer rewards, some as much as a guinea, suggests the impetus for this legislation came from these constituents.⁶⁴

Additionally, a work written in the 1760s, entitled Crude Thoughts on The Dog Act, all but credited the landed gentry for the failure to pass such a bill. The author noted that a rumor circulated that a clause would be attached outlawing the killing of game by all but a few of the gentry and aristocracy doomed this bill to failure. Other rumors such as there would be not only a heavy tax on dogs but an overwhelming rise in the qualifications for sportsmen, assured such a bill would not be passed.⁶⁵ The author believed that a dog tax would affect not just the gentry but all Englishmen. "It is evident the malevolent tendency such a law as the dog act would have upon public liberty must equally affect the whole people ; and the inhabitants of the country are not the only part of the nation which would feel the inconvenience of it."⁶⁶

The concern that such a bill would affect the gentry disproportionately appears to have been a major stumbling block for such legislation in the 1770s and 1780s. On March 26 1776 a motion was put to the House of Commons for establishing a dog tax. Three days later it entered into committee where it disappeared.⁶⁷ This would be the last real attempt in England for twenty years; it would not be until 1796 that such a bill was introduced again. In North America some ten years before this at least one of the new states had established legislation for a tax on dogs, legislation that arose directly out of a rabies outbreak in the northeast in 1785.

This was not the first time the northeast United States had experienced a rabies outbreak. The first occurred in the fall of 1769 and lasted until the late spring of 1770. The popular press provides a detailed record of it, including detailed descriptions of the human victims. The first confirmed case was a four-year old boy from Charlton (Charleston?), Massachusetts who on November 13 was bitten on the throat by a dog. The wound quickly healed and the child appeared fine until about a month later when he was suddenly seized with fits and an aversion to food. (It was noted in the records that this occurred during the full of the moon, suggesting that colonial New Englanders still believed to some extent in the astrological influence on

⁶⁴ For examples of rewards offered for lost eighteenth-century dogs see: Public Advertise (London) 17 January 1782 ; Morning Herald (London) 9 June 1783; Morning Herald (London) 11 March 1783.

⁶⁵ Anonymous, Crude Thoughts on The Dog Act (London: Privately Printed, 1762), 1-2. (hereafter Dog Act.)*

⁶⁶ Dog Act, 15.

⁶⁷ "Anno 16 Georgii III, Martii 22, 25 1776" in J. House Com., 35, 1775-6,

disease.) The fits increased and soon the child began to exhibit what were referred to as 'canine actions'. There was also a swelling of the face and a large discharge of saliva. These symptoms were followed within a day by convulsions and death. After the child died his body quickly swelled and livid spots appeared on his abdomen.⁶⁸

Even before this boy died actions were being taken by the authorities to control the disease. The General Court of the Colony of Connecticut resurrected an act originally passed in May 1765 which stated made it legal to kill any dog not confined, restrained or under the supervision of the owner. If an individual was sued for such an action they need merely refer to the above-mentioned act as evidence that they acted within the law. That such an act was passed in 1765 is not evidence rabies was prevalent then. It may simply have been an attempt to limit the killing of small livestock, such as sheep or goats, by stray dogs. This problem had existed since the early days of New England and had from time to time resulted in a dog or two being judiciously hung.⁶⁹

On February 5 a second human died in Hartford, Connecticut. The victim was an eleven-year-old boy who had been bitten on the leg by a dog some nine weeks earlier. The wound quickly healed and the child's recovery appeared uneventful. On February 2 he complained of a pain in the same leg. Soon after there developed severe swelling of his head and face. The pain increased until it became excruciating; at that point saliva constantly oozed from his mouth. The child had also lost all interest in fluids. His condition continued to deteriorate until he finally died.⁷⁰ This case caused so much alarm and concern that the selectmen of Hartford issued an order for residents to either confine or destroy their dogs and as well as any other strays around town. The order was strictly followed with, as the articles noted, 'a very great destruction made among those animals.'⁷¹

Additionally, In New Haven the following notice was seen in the local newspaper.

⁶⁸ New London Gazette (New London, Connecticut) 29 December 1769; Connecticut Courant (Hartford) 1 January 1770; Connecticut Journal (Hartford) 12 January 1770.

⁶⁹ Records of The Governor and Company of The Massachusetts Bay in New England, 5 vols. (New York: AMS Press, 1968), vol. 3 (1644-1657) 134.

⁷⁰ Connecticut Courant (Hartford) 5 February 1770 ; Connecticut Journal (Hartford) 9 February 1770 ; Boston Chronicle (Boston) 12-15 February 1770 ; New London Gazette (New London, Connecticut) 2 March 1770.

⁷¹ Connecticut Courant (Hartford) 5 February 1770 ; New London Gazette (New London, Connecticut) 9 February 1770 ; Connecticut Journal (Hartford) 9 February 1770.

MAD DOGS

ADVERTISEMENT

The authority and selectmen of the town of New Haven are desired to meet next Tuesday at one o'clock in the afternoon, at the statehouse, to consult on proper measures for securing of dogs, as instances of their running mad have happened in many towns to the eastward ; and so near as Wallingford, a boy and an ox were bit yesterday--and the dangerous infection seems to be coming near us and may be feared every day. By the advice of some of the authority and selectmen. N. Whiting⁷².

Within a week the measure was approved.⁷³ There were other concerns as to the possible spread of rabies. One of the notices from the end of the year not only notes the infection among swine but also suggests that eating pork from swine that were victims of this affliction might help spread it.⁷⁴

This epidemic, though, was minor compared to the outbreak of 1785. This time it occurred not only in New England but throughout the northeast. The modern historians who discuss this outbreak generally use the writings of Noah Webster as their primary source of information. Webster wrote of this outbreak: "In 1785 in America canine madness began to rage and spread in all parts of the northern states."⁷⁵ Webster further noted many of the newspapers of the times carried numerous stories of this outbreak. So detailed in fact are some of the descriptions that there is not only a fairly accurate list of the human victims but a record of most of their names.

The first record of this outbreak is an April 7 newspaper article detailing the death of 60-year-old Francis Erwin of Stratford, Connecticut. On February 27 his son spotted a strange dog in the yard. The animal, his son reported, 'seemed to act seriously'. The younger Erwin

⁷² Connecticut Journal (Hartford) 16 February 1770.

⁷³ Connecticut Journal (Hartford) 23 February 1770.

⁷⁴ *supra*, p. 52, n.71.

⁷⁵ Noah Webster, A Brief History of Epidemics and Pestilential Diseases, 2 vols. (Hartford: Hudson and Godwin, 1799), vol. 1, 277.

believed he was mad and immediately raised an alarm. This brought the elder Erwin outside where he was almost immediately bitten by the animal. Erwin's bite wounds, mainly on the face and hands, were immediately treated and he received standard therapeutics--salivating or mercuric medicines--for mad dog bite. After this initial care nothing more was done for nearly a month. Then on March 25 Erwin began to experience a strange pricking sensation in his bite wounds. By the 28th he was troubled with gastrointestinal distress; eventually it became so severe that he could no longer eat. The condition continued to deteriorate until March 31 when he became mentally unbalanced. At this point Erwin supposedly began to act like a dog: grinding his teeth, foaming at the mouth, and even attempting to bark or howl. Finally he died on April 2. Prior to becoming mentally unbalanced Erwin recognized the terminal nature of the ailment and is said to have spent his remaining lucid days regretting his sinful life and praying to God for forgiveness.⁷⁶

After Erwin's case little more is heard about this disease until the end of May. At that time notices and articles began to be seen describing an outbreak of canine madness and its victims in Boston in May and June.⁷⁷ In one notice it was recorded that in the course of a few days several dogs had gone mad and had bit several people. It was further recorded that on Wednesday May 19 a Miss Betty Simpson had died from a bite received from one of these animals. Another individual, one S. Demming, had also been bitten by a mad dog but had by late May showed no symptoms of hydrophobia.⁷⁸ By the first of June another unnamed woman from the North End of Boston was also ill with the general symptoms and was not expected to survive.⁷⁹ Soon after the disease appeared in New York State. One of the earliest towns affected was Albany. The situation there became so serious that the local magistrates issued an order that on July 14 all dogs were to be killed within the city.⁸⁰ This order proved less than effective--one writer observed that hundreds of Albany dogs were being shipped to other cities, such as New York, where they were in turn blamed for additional outbreaks of madness. In New York City the presence of these animals was considered responsible for the

⁷⁶ New Haven Gazette (New Haven, Connecticut) 7 April 1785.

⁷⁷ New Hampshire Gazette (Portsmouth, New Hampshire) 12 Aug 1785.

⁷⁸ The United States Chronicle (Philadelphia) 26 May 1785.

⁷⁹ The United States Chronicle (Philadelphia) 9 June 1785.

⁸⁰ New Hampshire Gazette (Portsmouth, New Hampshire) 12 August 1785; Connecticut Courant (Hartford) 1 August 1785.

death of one man and the certain future deaths of two others in the Bowery. This led the magistrates to immediately order all dogs be confined and all strays be killed.⁸¹

For both cities these measures were too little too late--people continued to be bitten and a few even died of hydrophobia. Near Albany a Baptist minister named Stubbs succumbed to this disease at the end of July. Like Erwin, the Reverend Stubbs also recognized the terminal state of his illness. Unlike Erwin Stubbs did not spend his final days repenting his sins. Instead, concerned with the danger he presented to his family, Reverend gave orders that prior to his becoming unbalanced he should be buried alive up to his neck. According to numerous sources this was done and it was in this condition that the good minister spent the last four days of his life.⁸² In New York City a 23-year-old butcher named James Mainold died of this disease on Wednesday July 27. Bitten some six weeks before by his own dog--the animal subsequently went mad--his wounds initially healed very quickly and he appeared well until July 22 when the first general symptoms of rabies appeared. From this point on his condition steadily deteriorated until he died on July 27.⁸³

These three above-mentioned cases are the only documented ones in which humans who died of rabies were identified by name. There are other references to individuals who died after being bitten by a mad dog. In Upton, Massachusetts by early August two or three people had died from the bite of a mad dog while in Gorham, Massachusetts, a mad dog bit a number of cattle.⁸⁴ In New Haven, Connecticut 2 children were bitten on August 11 by a mad dog;

⁸¹ New Hampshire Gazette (Portsmouth, New Hampshire) 12 August 1785; Boston Gazette (Boston) 8 August 1785.

⁸² New Haven Gazette (New Haven, Connecticut) 11 August 1785; Pennsylvania Mercury (Philadelphia) 29 July 1785; Connecticut Courant (Hartford) 31 August 1785; The United States Chronicle (Hartford) 11 August 1785.

⁸³ Connecticut Courant (Hartford) 3 August 1785; New Hampshire Gazette (Portsmouth, New Hampshire) 19 August 1785; The United States Chronicle (Philadelphia) 11 August 1785.

⁸⁴ New Hampshire Gazette (Portsmouth, New Hampshire) 12 August 1785; Boston Gazette (Boston) 22 August 1785; The United States Chronicle (Philadelphia) 11 August 1785.

there is no record, though, as to whether they survived the attack.⁸⁵ A similar case, also involving two children, may have occurred in Portsmouth, New Hampshire in August.⁸⁶

One of the best documented attacks involved animals as victims. On the night of July 31 a mad dog passed through the towns of Smithfield and North Providence, Rhode Island, attacking as he went. He bit a dog on the farm of a gentleman named Cushing and a dog and a cat at the farm of a major Jabez Whipple. The cat died very quickly ; soon after the dog began to show signs of madness and was killed. The other dog continued to live on until he began to show signs of paralytic rabies--it was observed he was "foaming at the mouth and his jaws were wide extended." Soon after he too was destroyed. Just prior to the appearance of the symptoms this animal bit a number of other dogs, all of which were subsequently destroyed⁸⁷. When one dog, belonging to one Henry Saunders, exhibited symptoms of madness this so alarmed his female relatives that they hid in a closet. Saunder's neighbors later managed to shoot the dog through the windows of his house. Another dog, belonging to a Mr. William Angell, went mad about the same time and was also killed. A third dog, belonging to one John Vial, also went mad and bit a cat which the very next day went mad and was subsequently killed.⁸⁸

Such attacks raised more than a little concern among the public. One newspaper author noted how easily the disease could be spread:

We are informed that there is scarce any poison infectious so many ways as this; it takes effect through the clothes, without fetching blood, by a touch of the froth; if recent, by handling the wound, or instrument which was the death of the animal; or by handling things which have been infected by any means; and it is seldom that any poison will produce such terrible contortions in the persons infected with this dreadful malady. When it begins to work, it is most violent and quick, and yet it is said, will be dormant for twenty years together before it exerts itself.⁸⁹

Another author, though, laid the blame at the feet, or paws , of man's best friend:

⁸⁵ New Hampshire Gazette (Portsmouth, New Hampshire) 12 August 1785; Boston Gazette (Boston) 22 August 1785.

⁸⁶ New Hampshire Gazette (Portsmouth, New Hampshire) 19 August 1785.

⁸⁷ Connecticut Courant (Hartford) 15 August 1785; Pennsylvania Mercury (Philadelphia) 26 August 1785; The United States Chronicle (Philadelphia) 11 August 1785. .

⁸⁸ The United States Chronicle (Philadelphia) 18 August 1785.

⁸⁹ New Hampshire Gazette (Portsmouth, New Hampshire) 19 August 1785.

The many melancholy instances lately exhibited of the fatal effects of the bites of mad dogs ought to put every person on guard. Every owner of a dog (who choses to risk keeping him) should watch him critically every morning, and on the least symptoms of madness appearing he ought, without hesitation, immediately to dispatch him.⁹⁰

For the most part, though, the blame for this disease fell to the stray dog population.

An early July newspaper notice observed:

The vast numbers of dogs in this city [Philadelphia] are, from their pereptual barking and fighting, a very great nuisance. Moreover, to say nothing of the expense of feeding them, the danger of their running mad, in the sultry weather we may expect, is a most alarming consideration.⁹¹

Not everyone felt the stray canines were the lone blame for this disease. One newspaper writer observed that, with respect to this disease, emotional attachment for the family dog could put both the owner and other innocent parties at risk for this disease:

It is surprising to see so many of the canine species running at large, when we are repeatedly receiving accounts of the fatal consequences resulting from such careless inattention. . . . The damage which has been done by dogs running mad is very great and warns us to be on our guard. If people are so fond of these domestics as to hazard their lives for their preservation, it is not reasonable that the lives of others should be endangered to gratify their humour.⁹²

With these outcries came the first attempts to limit the disease by limiting the interaction between its carriers and the human population. By August 1 Albany, New York, Portsmouth, New Hampshire and New York City had passed laws designed to limit the stray dog population. In Albany the methods proved very severe--all dogs in that city were to be killed--and only resulted in dogs that were considered valuable by their owners being sent to other communities.⁹³ In Portsmouth the method of control was far more moderate: all dogs were to be confined and all strays killed. Moreover, the enforcing of the confinement process, based

⁹⁰ New Hampshire Gazette (Portsmouth, New Hampshire) 2 September 1785.

⁹¹ New Hampshire Gazette (Portsmouth, New Hampshire) 12 August 1785.

⁹² New Hampshire Gazette (Portsmouth, New Hampshire) 19 August 1785.

⁹³ Connecticut Courant (Hartford) 1 August 1785; New Hampshire Gazette (Portsmouth, New Hampshire) 12 August 1785; New Hampshire Gazette (Portsmouth, New Hampshire) 12 August 1785.

mainly on word of honor, may have been somewhat lax.⁹⁴ In New York City the response was something similar to that seen in Portsmouth. The magistrates in late July ordered that all dogs be confined and the loose-running ones killed.⁹⁵ In New York the first legislation at something of a state level was implemented to deal with mad dogs. Sometime in the early summer the New York Legislature introduced a dog-tax of 8 shillings per annum for every dog. There is no evidence as to how long it was enforced but the fact that it was passed made New York the first in the English-speaking world with such a law.⁹⁶

In Providence, Rhode Island and New Haven, Connecticut measures similar to those in Portsmouth and New York City were seen. From Providence there was issued a municipal decree which was not only published in newspapers but also read throughout the town itself. This measure, passed by the town council, dealt with this disease outbreak.

This council taking into their consideration the various melancholy accounts of dogs running mad, and biting sundry persons, and the deplorable consequences resulting therefrom. . . ; viewing it, therefore, a duty incumbent on us, the said town-council to prevent, if possible, the dangerous consequences arising from dogs running at large while the said disease is prevalent, and being fully empowered hereto by the laws of the state. We therefore, the said town-council, do hereby make and enact the following regulations respecting dogs, viz--that every inhabitant in this town, owning a dog or dogs, shall within two days after the publication of this act keep them shut up, so as to prevent their going abroad during the present month, and until the first day of October next.

And it is hereby enacted, that, during the said period, it shall and may be lawful for any person, with impunity, to kill any such dog or dogs as are found running at large in this town. All persons living in the vicinity of this town are required not to suffer their dogs to follow them into town, as they will have no remedy, in case they are killed after this act takes place.

And it is ordered, that this act be immediately published, by the town sergeant by beat drum, throughout the town.

⁹⁴ Connecticut Courant (Hartford) 1 August 1785 ; New Hampshire Gazette (Portsmouth, New Hampshire) 19 August 1785.

⁹⁵ Boston Gazette (Boston) 8 August 1785.

⁹⁶ New Hampshire Gazette (Portsmouth, New Hampshire) 12 August 1785.

By the order of the town-council
Theodore Foster, council clerk.⁹⁷

In New Haven the selectmen met on August 15 and decided unanimously on a similar measure:

That from and after the seventeenth day of August, no dog, within the limits of said town shall be suffered to go at large; and it shall be lawful for any person whatever to kill and destroy any dog that may be seen at large in said town, after said seventeenth day of August.⁹⁸

Civil Authorities
Daniel Lyman
Samuel Bishop
Timothy Jones
Simeon Bristol

Whether these measures helped lessen the impact of the outbreak is questionable. By October the disease had pretty much run its course. With this outbreak the pattern for rabies occurrence in the United States was established: the first cases would appear in late May or early June and the numbers would gradually increase until by late August the disease had reached almost epidemic levels. Because of this pattern, any attempts at animal control would not work if they were implemented in July or August; it was too little too late. What was needed was animal control on a year-round basis. The New York Legislature, by its implementing of a dog tax, had provided an outline for such a system. It appears that enforcement was at best irregular; New York would continue to suffer from rabies outbreaks in urban areas almost up to the twentieth century.

The New York Dog tax could be considered the first serious attempt at prevention of rabies before it appeared. Little, though, is known about the exact mechanism for passing this legislation. Some ten years later in London a similar tax was passed as an attempt to provide England with a national form of animal control. The reasons for its introduction, mechanism of its passage and enforcement and possible reason for its repeal are fairly well documented. They indicate that, as far as the gentry were concerned, 'no good deed goes unpunished'.

⁹⁷ The United States Chronicle (Philadelphia) 18 August 1785; New Haven Gazette (New Haven, Connecticut) 8 September 1785.

⁹⁸ New Haven Gazette (New Haven, Connecticut) 18 August 1785; Connecticut Courant, (Hartford) 22 August 1785.

A question that should be asked why a dog tax was passed in England in 1795, as compared to other years. One answer may be a serious outbreak of rabies among both humans and animals appears to have occurred in that year. The English obituaries contain numerous references to individuals dying of this disease. One of the first appears to have been a servant from Barnstable named Robert Pick. Pick, along with a maidservant in the same household, had been bitten in the late spring by a mad dog. Pick's wounds healed uneventfully and for a number of weeks he had exhibited no other symptoms. Then on June 7 the first general symptoms of hydrophobia appeared. They increased in severity very quickly and by June 10 Pick died while suffering violent convulsions. Within two weeks the maid also suffered a relapse and died. Because of these deaths and other attacks by mad dogs in Barnstable the mayor ordered all dogs to either be muzzled when in public or destroyed.⁹⁹

In July Lord Belfast was bitten by a mad dog; the attack, though, did not result in his death.¹⁰⁰ An eight-year old girl from Lewes named Sarah Hook was not so lucky; she died on July 1 of hydrophobia. Sarah was the second child to have died of this disease in Lewes that summer. At least two other children had been attacked but by July 16 were still alive. All four of these children had been bitten by the same animal.¹⁰¹ In August another child, five-year old William Brewer of London, also died of hydrophobia. Bitten on the face on August 1 Brewer exhibited no symptoms for two weeks. On August 15 he became somewhat feverish. By the 17th symptoms of hydrophobia, wild eyes, frothy saliva, and a hoarse voice, had appeared. Brewer soon after began to have convulsions; in time they became so severe that he had to be tied to his cradle. Brewer's condition continued to deteriorate until at last he died on August 21.¹⁰² In September a gentleman from Lancaster named Webb also died of this disease. Bitten in July on his hands and legs, Webb showed no symptoms of hydrophobia until September 14. Once the symptoms appeared Webb's condition deteriorated so quickly that he was dead by September 18.¹⁰³

Finally, in December two more individuals died of hydrophobia. The first, a 28 year-old hairdresser named Andrew Dunsmore, had in November been scratched by a cat believed

⁹⁹ Anonymous, "Obituaries of Remarkable Persons," Gentlemen's Magazine 45 (1795): 533-534.

¹⁰⁰ London Times (London) 16 July 1795.

¹⁰¹ Ibid.

¹⁰² London Times (London) 2 September 1795.

¹⁰³ Anonymous, "Obituaries," Gentlemen's Magazine 45 (1795): 797.

to be mad. His wounds healed and Dunsmore enjoyed good health until Christmas morning. His first symptoms, a violent pain in the bitten part and a bad headache, quickly turned very severe and by 4 a.m. December 26 Dunsmore was dead. The same day a laborer named John Girdley, living in Little Leicester Street, also died of this disease. Girdley, who had been bitten approximately one month before, had received a full regimen of preventive measures and had exhibited no symptoms until December 24.¹⁰⁴ When the symptoms did appear, though, they very quickly became very intense. By December 26 he exhibited foaming at the mouth, inarticulate speech and severe convulsions. He eventually died at 2 P.M. that afternoon.¹⁰⁵

Girdley was the eighth recorded death from hydrophobia in England for 1795--there may have been more. This fatality rate made the 1795 outbreak more severe than the earlier 1760 outbreak. Moreover, the records suggest that the 1795 outbreak may have been a continuence of an earlier one. The London Bills of Mortality indicate that in 1794 at least four people died of hydrophobia.¹⁰⁶ In October of that year a gentleman named John Ellis from Lichford in Sussex also died of this disease.¹⁰⁷ Because of this severe attack petitions began to arrive at Parliament demanding the control of the dog population through a tax. One such was a petition from Leicester which told of a recent outbreak of rabies in that county.

A petition of the gentlemen, Farmers, Graziers, Breeders of Sheep and others, residing in the county of Leicester was presented to the House of Commons and read; setting forth, that many fatal, afflicting and calamitous events have of late happened, both to human and brute species, from canine madness. . . .¹⁰⁸

Another petition, from the residents of Worcester, stated that a dog tax would "in a considerable degree, remove the alarms which the people in general labor under from the apprehension and dread of canine madness."¹⁰⁹

¹⁰⁴ Dunsmore's death was the only one recorded in the London Bills of Mortality as being due to Hydrophobia. The records, though, note he was bitten rather than scratched by a mad cat. See : "Bills of Mortality, London, 1795" Rare Books, British Museum, London.

¹⁰⁵ Anonymous, "Obituaries," Gentlemans Magazine 45 (1795): 1113-4.

¹⁰⁶ "Bills, 1794" British Museum.

¹⁰⁷ Anonymous, "Obituaries," Gentlemans Magazine 44 (1794): 1055.

¹⁰⁸ "Anno 36, Geo III, March 3, 1796" J. House Com. , 41, 1795-96, 463.

¹⁰⁹ "Anno 36, Geo III, April 5, 1796" J. House Com. , 41, 1795-96, 554.

On April 28 a dog-tax bill was drawn up. It was first presented to Commons on May 3. Soon after the bill became the center of a rather involved debate. One of the major issues, but by no means the only one, was the actual extent of hydrophobia in England. One member, John Dent, observed:

Hydrophobia had lately increased to a shocking degree. In one week, in the course of last year, no fewer than 33 persons infected with this distemper had applied to the Manchester Infirmary and in Southampton between 200-300 people were bit by mad dogs.¹¹⁰

Another member, John Courtenay questioned these statistics.

It had been asserted that 200 or 300 persons had been bitten at Southampton; but where is the proof of this? It was customary, especially since this bill had been in agitation, to report, that every species of insanity, from a strait-waistcoat phrenzy, to a fit of the vapours, were occasioned by the bite of a dog. Not one case out of fifty, said to be attended with strong symptoms of the hydrophobia, was actually founded on fact.¹¹¹

William Wilberforce, while agreeing in part with Courtenay, still believed any measure that would decrease the dog population would help against hydrophobia: "though the hydrophobia did not so often as was generally supposed, proceed from the bite of mad dogs, yet it was so often the case, that everything should be done that had a tendency to abridge the excessive number of these animals."¹¹²

Some worried about the negative effect this tax might have on dogs in general. William Windham, while he felt the tax was fair for sporting dogs, because they were a luxury, was still concerned such a measure could produce 'an enmity towards the canine race'. Windham felt this would be unfair for the poor due to the many roles these animals played for this class, roles that included a certain amount of emotional support. "If the rich man feels a partiality for a dog, what must a poor man do who has so few amusements? He would be destitute without one. A dog was the companion of his laborious hours, and when he was bereft of his wife and children it filled up the dreary vacuity."¹¹³ In the end William Pitt, the Chancellor of The Exchequer, concluded dogs were a fit object of taxation and asked that no objections be made

¹¹⁰ The Parliamentary History of England, vols. (London: Bagshaw, 1818), 32, 1795-97, 1004.

¹¹¹ Parlia. Hist., 32, 1795-97, 1006.

¹¹² Parlia. Hist., 32, 1795-97, 997.

¹¹³ Parlia. Hist., 32, 1795-97, 1000-2.

to the bill.¹¹⁴ His wishes were honored and with only minor changes the bill was passed on May 13.¹¹⁵ It was taken to the House of Lords where it passed on May 18. On May 19, His Majesty gave royal assent, making it law.¹¹⁶

The bill divided taxpayers into three categories: persons keeping sporting dogs, such as a Hound, Pointer, Setting Dog, Spaniel, Lurcher, and Tarrier (Terrier); persons keeping non-sporting dogs, and persons keeping packs of hounds. The duties were: for the first class 5s. for every dog, for the second class 3s. for every dog, and 20 £ per pack of hounds. Puppies and whelps under the age of 6 months were exempted.¹¹⁷ Records of this tax are still available and indicate not only of the makeup of the canine population but also the eventual cost of the tax for the owners, a cost that was especially heavy for those owning large numbers of sporting dogs. The evidence, from the Charing Cross Ward tax records, suggests most of the dog owners owned only one dog and most of the dogs were of the non-sporting variety. A total of eighty-five owners are mentioned in these records. The number of dogs per owner breaks down in the following way.

No. of owners.	No. of dogs/owner	percentage
73	1 dog	85
10	2 dogs	11
1	3 dogs	2
1	5 dogs	2

Approximately 4 % of the dog-owning population of Charing Cross kept more than two of these animals, while nearly 85% kept only one. The records also indicate a paucity of sporting dogs among the resident canine population. The breeds of one hundred and one dogs noted for the tax breaks down as follows.

2 terriers
4 spaniels

¹¹⁴ Parlia. Hist., 32, 1795-97, 1006.

¹¹⁵ "Anno 36, Geo III, May 12, 13, 1796" J. House Com., 41, 1795-96, 768, 782.

¹¹⁶ "Anno 36, Geo III, May 18, 19, 1796" J. House Com., 41, 1795-6, 791-2.

¹¹⁷ "Anno Regni Tricesimo Sexto, Georgii III, c. 124" in The Statutes at Large from Magna Charta to 1806 vols. (Cambridge: Cambridge University Press, 1807), vol. 40, pp. 841-45; Anonymous, "Domestic Occurances," Gentlemen's Magazine 46 (1796): 520; Stephen Dowell, A History of Taxation and Taxes in England, 2nd ed., 4 vols. (London: Longsman and Green), 1888, vol. 3, 260-61; Munsche, 83.

1 pointer
 1 hound
 1 lap dog
 92 unidentified dogs

Better than 90% of the dogs were of the nonsporting variety. Unfortunately the breeds of these ninety-two animals cannot be identified so it cannot be determined how many of these animals were working dogs of another variety, such as guard dogs. One can hypothesize that the vast majority of animals were probably kept as pets.

These records also indicate that, for certain members of the gentry, the tax could be very expensive. The records of the numbers of dogs owned by Lord Spencer suggest they were very popular with him.

Northamptonshire

animals	cost per animal	total cost
A pack of Hounds	20£/pack	20£.
2 Pointers	@5s. ea.	10s.
3 spaniels	@5s. ea.	15s.
2 deer dogs	@5s. ea.	10s.
1 Newfoundland	@3s. ea.	3s.

North Creek

10 Pointers and Spaniels	@5s. ea.	50s.
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Wimbleton

2 Yard dogs	@3s. ea.	6s.
6 Pointers and Spaniels	@5s. ea.	30s.

Total 124 s. x 1£/20 s. = 6£ 4s. + 20£ = 26£ 4s.

26£ 4s. was a lot, even for an Englishman with a title.¹¹⁸

¹¹⁸ "Records, Dog Tax, 1797" Ms, Special Collections, Westminster Library, London.

The tax appears to have little or no effect on the number of reported rabies cases. The London Bills of Mortality note that for 1796-7 at least three people died of this disease, a rate comparable for London prior to the tax.¹¹⁹ There are among the national obituaries at least three cases of hydrophobia. The first, from July 1796, described the death in Basford, near Nottingham, of a 14 year-old boy named W. Vickerstaff. Bitten by a dog on June 15 he did not exhibit any general symptoms until July 10. Once they appeared the disease progressed so rapidly that Vickerstaff died within 48 hours.¹²⁰ A second case, occurring in February 1797, involved the death in Bath of 3 year-old girl. Bitten by a terrier on Christmas day --the animal was eventually killed--her symptoms did not appear until February. Within five days of the appearance of these symptoms, though, the child was dead.¹²¹ A third case, from London, involved the death of a gentleman named R. Luke in July 1797. Bitten sometime in late May by a mad dog, Luke received all the appropriate treatments. His wound healed and his concern for the disease largely dissipated. The general symptoms, which began to appear five weeks later, started with rheumatic pains. The disease progressed so rapidly that within five hours of the appearance of these symptoms Luke was dead.¹²²

The tax managed to survive just two years. Then in March 1798 a rider was attached to a bill, repealing certain duties on clocks and watches, which repealed duties on servants, horses, mules, carriages, and dogs.¹²³ After a series of readings and a number of amendments the bill was passed by the House of Commons on April 30.¹²⁴ The House of Lords passed it on May 9 and sent it to the King who gave his Royal Assent on May 10, 1798.¹²⁵ The bill removed the taxes on dogs, horses, servants carriages and mules and replaced them with a property tax.¹²⁶ The first national dog tax, having survived less than two years, passed into history.

Despite its apparent inability to survive this early bill set a precedent for future bills. In a way the repeal of the dog-tax was the final act in the eighteenth-century struggle against

¹¹⁹ "Bills, 1796-7" British Museum.

¹²⁰ Anonymous, "Obituaries," Gentlemans Magazine 46 (1796): 621.

¹²¹ Anonymous, "Domestic Occurances," Gentlemans Magazine 47 (1797): 165.

¹²² Anonymous, "Domestic Occurances," Gentlemans Magazine 47 (1797): 609.

¹²³ "Anno 38, Geo III, March 23, 1798" J. House Com., 53, 1797-98, 401.

¹²⁴ "Anno 38, Geo III, April 30, 1798" J. House Com., 53, 1797-98, 518.

¹²⁵ "Anno 38, Geo III, May 9, 10, 1798" J. House Com., 53, 1797-98, . 555, 561-2.

¹²⁶ "Anno Regni Tricesimo Octavo Georgii III, c. 41" in Statues, 41, 647-661.

rabies, a struggle that had evolved from classical medical approach to that of a modern scientific nature. As the nineteenth century came into being the struggle against rabies would show new impetus. This was due in part to medical research in this area. Additionally, the evolution of the veterinary profession from a craft into a sound scientific organization would help reform many of the beliefs held about this disease.

CHAPTER 9: POSTSCRIPT: INTO THE NINETEENTH CENTURY

As the eighteenth century became the nineteenth there was little change in the beliefs about rabies and mad dogs. The disease was now perceived as being more geographically widespread. For the first time cases were being reported from Canada. In time one of its victims would be the Governor-General of this colony. Rabies was also reported in the arctic. At this time the first references were seen of rabies being communicated by wild animals.¹ In England and the United States the disease became more prevalent. In the 1820s and 30s it became endemic in London while in New York and Boston rabies outbreaks in the 1840s became so severe that they led to dog-killing that shocked even the municipal authorities who authorized them.

The medical and veterinary practitioners proved no more successful at diagnosing, treating or preventing this disease than their eighteenth-century associates. Attempts at diagnosis were handicapped by the same problems that existed in the eighteenth-century--a similarity in the symptoms of diseases such as tetanus in humans and distemper in dogs and cats. To this was added a number of newly recognized conditions, such as lead poisoning or cirrhosis of the liver. The one consolation, that treatments no longer involved bleedings, purgings and blisterings, did not occur until mid-century, when sedatives, opiates and supportive therapies became standard fare. Preventive measures were largely extensions of eighteenth-century measures. There were one or two new processes, though, such as licensing and the muzzling of all dogs when they were in polite society. Still, this provided little, if any, relief from the rabies outbreaks.

Before the century was over, however, the scientific community would establish that this disease was caused by a microorganism and that it was spread by body fluids, in particular saliva, from an infected animal or human. It would also be determined that not every animal that bit was rabid and not every bite of a supposedly rabid animal would cause rabies. From

¹ George Russell , " Case of Hydrophobia, from The Bite of A Raccoon," New England Journal of Medicine and Surgery XII (1823): 363.

these first advances medical and veterinary science would move towards exact methods of diagnosis and effective means of treatment. Measures based on this new knowledge would also lead to efficient means of prevention and control. These advances were due in large part to the achievements in the eighteenth century which put medicine on a firm scientific footing. With the death of humoral theories of disease and the rise of anatomical pathology and pathophysiology, medical scientists began to make a more concerted effort to understand certain diseases, such as rabies. The practice of attempting to produce an infection through the artificial inoculation of experimental animals, once done only occasionally, now became a relatively standard procedure.

These changes were accompanied by, and often interrelated with, the change in the status of veterinarians. For this profession the nineteenth century was a time of great advancement. Starting as little more than glorified blacksmiths, stableboys and kennel keepers, the veterinarian by the 1880s proved to be both an integral and an indispensable member of the scientific community that established the means of exact diagnosis and the methods of effective treatment and control. The strong interrelationship between the rise of this profession and the rise of the scientific investigation of disease was due to three men : John Hunter, Edward Coleman and Everard Home. Of the three, Hunter's contribution was the most profound. A major figure in the establishment of scientific surgery in the English-speaking world, Hunter also made large contributions to the study of both anatomical pathology and pathophysiology. The best reflection of this is seen with his nephew Matthew Baillie who wrote one of the earliest texts on anatomical pathology.

Hunter proved a strong influence through other students, such as Edward Coleman. One of the first, and for nearly forty years, the only professor of the Royal Veterinary College, Coleman has in the past been pictured in a less-than-positive light. One historian, Sir Frederick Smith, noted: "He seems to have been impervious to any new knowledge. He was opposed to all progress, to all change. . . ." ² These evaluations are at best simplistic, at worst ignorant. Coleman was a far more complex, far more competent medical scientist than previously believed. He was a member of the Guy's Hospital Physical Society, an eighteenth-century medical organization that included some of the most prominent physicians and surgeons in London.³ Coleman's area of interest, blood transfusion, has yet to be well investigated but

² Smith, *Early History*, vol. 3, 25-28.

³ Wall, 159-170; Campbell, 107-119.

even the most cursory examination indicates his research was comparable to that of the other members.⁴

One of the great complaints against Coleman was that he placed special emphasis on the horse in the early veterinary school curriculum.⁵ Such a complaint can be explained to some extent by the fact that when, in 1791, the school first opened England was at war with France. This conflict would continue on and off for the next twenty-four years. Thus, it should not be surprising that the veterinary college would place special emphasis on an animal used heavily by the military; after all it was generally understood that one of the reasons private medical schools existed in the late eighteenth and early nineteenth centuries was to provide surgeons for the military.

Coleman's work in military veterinary medicine is inconsistent. His written work in this area, a manual entitled Instructions for The Use of Farriers attached to The British Cavalry and To The Honourable Board of Ordinance was described by Smith as: "a disgrace to the age and nation."⁶ This conclusion is simplistic and historically unprofessional. While many of Coleman's therapeutics: rowells under the skin, blistering and bleeding, could be seen as both crude and inhumane from a twentieth-century point-of-view, in the early nineteenth-century they were standard operating procedures, no more severe than many of the practices seen in human military medicine. In the treatment of gunshot wounds Coleman proved to be equal or superior to much seen in the human medicine. He did not believe in making the wound worse by engaging in brutal methods of bullet extraction. The poultices and astringents he suggested were mild compared to other treatments. Overall, his treatment of gunshot wounds compares favorably to human military medical manuals.⁷

Then there was also the work of Everard Home, John Hunter's brother-in-law. Home continued much of Hunter's investigations in veterinary science. It was originally believed that Hunter's influence on veterinary science largely disappeared after his death in 1793. Recent evidence suggests Everard Home continued Hunter's research and that much of it was in

⁴ "Minutes, Physical Society" Guy's Hospital, December 13, 1778.

⁵ Smith, Early History, vol. 3, 25.

⁶ Smith, Early History, vol. 3, 31.

⁷ Edward Coleman, Instructions for The Use of Farriers Attached to The British Cavalry (London: Privately Printed, 1796), 12-13; Thomas Chevalier, A Treatise of Gunshot Wounds (London: Bagster, 1804), 83-4, 116, 120-5.

association with the veterinary college.⁸ Home's writings describe numerous examples of veterinary pathology as well as veterinary medical and surgical cases. He noted the dissection of a hermaphrodite dog and described urinary calculi in the kidneys and bladders of horses, oxen, dogs, hogs, rabbits and even a rhinoceros.⁹ Home also described stomach botts in a two-horned rhinoceros from Sumatra that closely resembled stomach botts seen in horses in England, as well as hydatid worms in the brains and livers of sheep.¹⁰ He related the case of a dog with an abnormal accumulation of water in the third ventricle of the brain which for four years caused insensibility, convulsions and pain in this animal. Home noted that while opium helped relieve the pain, only death released the creature from the first two symptoms.¹¹

Home was also actively involved in anatomical and physiological research. He examined in horses the flow of lymph from the spleen to the thoracic duct. Home also did comparative anatomical studies of the eyes, teeth and digestive systems in different domestic animals. Home's research at the veterinary college brought him in close contact with the deputy professor William Sewell. How much influence Home had on this individual is difficult to gauge. It is well established that on Coleman's death in 1839 Sewell became the primary professor and immediately began to make major changes in the curriculum, including courses on diseases of livestock--something both Hunter and Home had advocated in the beginning.¹²

These individuals helped lay the foundation for the scientific investigations of a second generation of veterinary students, investigations that would rival those done by the medical scientists of the period. Two of the most prominent of these veterinary scientists were Delabere Blaine and William Youatt. Both wrote extensively on rabies and both at one time or another struggled with the still extant belief of spontaneous rabies. This belief had survived largely

⁸ John Blaisdell, "John Hunter, Everard Home And The Establishment of The London Veterinary College," Historia Medicinae Veterinariae 15 (1990): 41-63.

⁹ Everard Home, Lectures on Comparative Anatomy, 6 vols. (London: G and W. Nichol, 1814-28), vol. 5, 30-33 ; Everard Home, "The Croonian Lecture on Muscular Motion," Philosophical Transactions of the Royal Society. 85 (1795): 204-5 ; Everard Home, "An Account of the Dissection of An Hermaphrodite Dog ; to which are prefixed some Observations on Hermaphrodites in General," Philosophical Transactions of the Royal Society 98 (1799): 157-8.

¹⁰ Home, 1814-1828, vol. 3, 128.

¹¹ Home, 1814-1828, vol. 3, 78.

¹² Blaisdell, Hist.Med.Vet., 1990, 54-55, 57-58.

intact into the nineteenth century. One medical writer, in discussing this disease, noted: "the animals in whom this spontaneous malady most usually occurs, are those of the canine race: that, so far as we yet know, the saliva is the secretion in which this peculiar poison is most abundant". He also suggested rabies might also occur spontaneously in humans under considerable stress: "hydrophobia has accordingly appeared occasionally in people labouring under other diseases of excitement and irritation."¹³ A second author, while he did not believe the disease occurred spontaneously in humans, felt it did in dogs: "you may believe it as a positive fact, that this disease never arises spontaneously in man. . . . The disease arises naturally in a great variety of animals, such as the dog, the wolf, the jackal, etc..¹⁴

Both Blaine and Youatt questioned the spontaneous rabies beliefs. Blaine wrote: "It may be. . . regarded as an incontrovertible fact that every rabid dog has been previously bitten: nor can any disease, pain, irritation bring on the malady ; nothing short of inoculation by the bite of a rabid animal and/or any insertion of the rabid virus into a wound or abraded surface [cause it]."¹⁵ These remarks suggest Blaine may have engaged in experiments involving artificial inoculation. In fact, he based his conclusions entirely on clinical experience.

Out of the vast variety of cases that have come under my notice, I never met with one in which I could not trace the certain exposure of the animal to danger, although I have often had to examine very closely to come at the truth.¹⁶

Youatt, on the other hand, wavered on this belief. In 1826 he suggested rabies occurred spontaneously in dogs, brought on by an exaggerated propensity for violence.

Although there have been many instances of considerable disease having been produced by the bite of an enraged animal, I have never heard that rabies has been the result of such bite, nor do I believe it possible; there is a view of the subject, in which the prevalence of rabies does materially depend on the disgraceful practice of dog-fighting.¹⁷

Later, in 1828, Youatt questioned the belief in spontaneous rabies.

¹³ H. Robertson, "On Hydrophobia," Lancet 16 (1828/9): 741-2.

¹⁴ M. Colles, "On Hydrophobia," Lancet 10 (1826): 73-4.

¹⁵ Delabere Blaine, Canine Pathology (London: T. Booset, 1817), 10.

¹⁶ Blaine, 103.

¹⁷ William Youatt, "Hydrophobia," Philadelphia Journal of Medical and Physical Science 12 (1826): 381.

No one, I fancy, will deny, that in man, horses, cattle, sheep and swine, rabies is caused by inoculation alone ; but it is said to be spontaneous in the dog and his varieties. If, however, it is spontaneous origin be denied in so many animals, where is the proof that it arises in any animal without the contact of the rabies virus.¹⁸

Noting heat, thirst and putrid meat were thought to be factors causing spontaneous rabies, Youatt related an experiment from the French veterinary college at Alfort in which three dogs were exposed to hot weather: one without water, one with water and one with salted meat. None of these animals ever showed any evidence of rabies. He further observed that in nineteen out of twenty cases of rabies inoculation could be definitely established. Youatt noted in some cases rabies could be spread by injecting infected materials. "Bread, smeared with the saliva of a rabid dog, has been eaten by another dog without the slightest bad consequence; but two horses that had been suffered to devour the litter on which some rabid pigs had lain were lost to this disease."¹⁹

Youatt believed three factors must be present for proof that spontaneous rabies had occurred: the symptoms must indicate rabies, post-mortem changes must indicate rabies and there must be no evidence that the affected animal was ever bitten or inoculated for this disease. He concluded spontaneous rabies must arise as a result of a 'manifest cause separate from inoculation.'²⁰ He put these beliefs to the test in refuting a case of spontaneous rabies in a spaniel. The animal came down with, and eventually died of, what was supposedly rabies even though he had not engaged in any social interaction with other members of his species. An autopsy indicated ulceration of the gastrointestinal tract but nothing else. Based on this and the violent symptoms observed, the veterinary practitioner who wrote up this case assumed it was spontaneous rabies.²¹

Youatt found this diagnosis faulty. He noted the pathological evidence did not suggest rabies : "I confess I cannot recognize in this [autopsy] one character of rabies". Youatt believed the animal succumbed to an inflammatory fever.²² He acknowledged that much of the problem with this disease was the lack of a confirmatory diagnostic test.

¹⁸ William Youatt, "On Rabies Canina," Veterinarian I (1828): 155.

¹⁹ Youatt, 1828, 156-8.

²⁰ Youatt, 1826, 383-6; William Youatt , "On Spontaneous Rabies," Veterinarian III (1830): 507.

²¹ M. Dewhurst, "On Spontaneous Rabies," Veterinarian III (1830) 446-7.

²² Youatt, " Spontaneous Rabies," 1830, 446-7.

I believe that the only reason why there is not a universal agreement as to these facts is that the characteristic symptoms of rabies in the dog are not determined. That which may term "rabies" may be, and I imagine would be, found to be tetanus, or epilepsy, or phrenitis or distemper.²³

Youatt based his conclusions not only on clinical cases but on experimentation. In the late 1820s he made some attempts at artificial inoculation.

I have made two experiments, the results of which were very satisfactory. Three pieces of tape were moistened thoroughly with the saliva of a rabid dog, and inserted as rowels into the polls of three dogs. To two the scutellaria²⁴ and belladonna were given; the third, a fox-hound bitch, was abandoned to her fate. On the twenty-ninth day after the inoculation she became rabid, the others are living and well.

I afterwards took the same two dogs and a third. I moistened two peices of tape with the saliva of a rabid dog and inserted them into the polls of one of the old ones and the third dog. another piece of tape, dragged repeatedly through the mouth of the same rabid dog twenty-four hours after its death, was inserted in the poll of the second of the old dogs. This dog and the new one were suffered to take their chance ; to the other old dog the medicine was given. In the fourth week, the new dog died, undeniably rabid ; the other two yet live.²⁵

The two survivors may have been two of the earliest canines to benefit from preventive, albeit unintentional, vaccination.

In another case Youatt attempted artificial inoculation with negative results--the animal never came down with the disease.²⁶ He also attempted to inoculate rabies into a dog by rubbing the creature's gums and lips with saliva of a rabid dog, without success. Lastly, Youatt took saliva from sheep that had died of rabies and injected a horse, two dogs, and two

²³ Youatt, 1826, 383-6.

²⁴ In the early nineteenth century Scutellaria was considered one of the more efficacious treatments for rabies, especially in the United States. See : W. Still and B.R. Robson, "On The Cure of Hydrophobia," American Farmer I (1819): 234-7 ; Anonymous, "Scull Cap," American Farmer II (1820): 202-3.

²⁵ Youatt, " On Rabies Canina," Veterinarian, II, 1829, 180.

²⁶ William Youatt, "A Case of Rabies in The Dog Connected with A Violent Spasm in The Attempt to Swallow," Veterinarian III (1830): 574.

sheep and a lamb. Despite inoculation and constant exposure to the rabid sheep none of the six animals ever developed rabies²⁷. Youatt noted with respect to the process of inoculation: "the experiments would fail as often as succeed."²⁸

Youatt was not alone in attempts at the artificial inoculation of rabies. The most recognized attempt in the early nineteenth century was that made by G. C. Zinke in 1804. His work was outlined in the 1807 edition of the Philadelphia Medical Museum. Zinke took saliva from an animal that died of rabies and inoculated a healthy dog. The animal remained well for seven days, on the eighth his appetite fell off and he began to show signs of depression; within two days he was diagnosed as rabid. A second dog was inoculated with the same saliva, diluted in a solution of arsenic and water. Aside from some initial inflammation of the inoculation site the animal exhibited no sickness.

Zinke also inoculated a cat with the saliva diluted with tincture of Cantharides. Like the first dog, this animal began to show signs of rabies eight days later. Additionally, a rabbit, inoculated with the saliva diluted with volatile alkali, also came down with rabies. Another rabbit, inoculated with the saliva diluted with healthy saliva, remained healthy. A dog, inoculated with rabid saliva diluted with a solution of water and phosphorus, showed some initial inflammation of the injection site but nothing else. Lastly, a rooster, inoculated with rabid saliva mixed with gastric fluid from a cat, came down with rabies within fourteen days. Zinke concluded from the experiments that certain caustic materials, especially arsenic, if quickly applied to bite wounds would prove efficacious in preventing rabies.²⁹

At much the same time as Zinke an English veterinary practitioner was conducting experiments involving a rabid cow and a chicken. In March 1807 a cow near Weston, England was discovered to be rabid. Before much could be done the animal died. A veterinary practitioner, Ashburner, collected saliva before she died and injected some of it into a hen. Two weeks later this bird stopped eating. She became first irritable and then catatonic and eventually died. A post-mortem examination revealed only some minor inflammation of the

²⁷ Anonymous, "Communication of Hydrophobia from Rabid Sheep to Other Animals," Lancet 16 (1829): 42.

²⁸ William Youatt, "Canine Madness," Veterinarian IV (1831): 21.

²⁹ Anonymous, "Observations on Hydrophobia," Philadelphia Medical Museum 3 (1807): ccxii-ccxiv.

trachea and esophagus. Nevertheless, it was concluded that rabies had been artificially produced in this chicken.³⁰

In France at much the same time, attempts were being made artificially to produce this disease. At the Veterinary Institute in Bordeaux a scientist named M. Dupuy used a sponge impregnated with saliva from a rabid cow to infect oxen and sheep. None of the animals came down with rabies. When Dupuy repeated the experiment, using this time saliva from a mad dog, the experimental animals developed the disease.³¹ A French physician, meanwhile, managed artificially to produce rabies in a dog with saliva from a man who had died from the disease.³² Lastly, a French medical scientist named Dupuytren inoculated one dog with blood from a human with clinical rabies and another with saliva from a rabid dog. He then took blood from the latter animal and injected it into a third dog. None of these animals came down with rabies.³³

In England in the 1820s attempts at rabies inoculation were being made by a number of medical men, more than a few associated with Guy's Hospital. In one case inoculation may have been done to determine positively rabies as cause of death. A young man, bitten on the left hand by a dog, supposedly came down with rabies. His condition deteriorated so rapidly that he entered the hospital at noon, was treated at 2 p.m. and died at eight that night. An autopsy revealed little in way of gross pathology. It was probably because of this lack of definitive evidence that artificial inoculation was attempted. Two animals, a dog and a rabbit, were inoculated with the dead man's saliva. The rabbit eventually sickened and died; it was the opinion of the medical scientists, though, that rabies did not cause the animal to die.³⁴ William

³⁰ J. Ashburner, "Case of Rabies in The Cow and The Domestic Fowl," Veterinarian I (1828): 323-4 ; Anony., "On The Communication of Rabies by All Rabid Animals," Veterinarian IV (1831) 228-9.

³¹ M. Peyronnie, "Observations on Rabies in The Domesticated Animals," Veterinarian VII (1835): 201.

³² M. Magendie, "Experiments on Hydrophobia," Philadelphia Journal of Medical and Physical Science 3 (1821): 185.

³³ M. Lawrence, "Lectures on Surgery, Medical and Operative," Lancet 17 (1829/30): 671.

³⁴ Anonymous, "Hospital Reports, Guy's Hospital, Case of Hydrophobia," Lancet 12 (1826/27) 155 ; Anonymous, "Hospital Reports, Guy's Hospital, Inoculation of a Dog and A Rabbit," Lancet 12 (1826/27) 318.

Babington also attempted artificial inoculation, with mixed results. He inoculated two rabbits with saliva of a mad dog. One rabbit developed an infection and died, the other never became sick. Babington later inoculated six more rabbits with saliva from a woman who had died of rabies. Three of them eventually died of the disease.³⁵ At St. Bartholomew's Hospital artificial inoculations were also being done. In 1826 following the death of a coachman six rabbits were inoculated with this individual's saliva; none of the animals showed signs of rabies.³⁶

One of the most extraordinary cases of artificial inoculation involved a surgeon supposedly inoculating himself with saliva from a rabid dog. In a lecture on clinical medicine one Dr. Elliotson alludes to this as an attempt to support the belief in rabies in humans as mainly an hysterical condition.

Perhaps you will be surprised when I tell you that some persons actually doubt the existence of this disease (rabies), ascribing the whole to fear. . . . An attempt at proof has been made by one surgeon inoculating himself with the salver [saliva] of a rabid dog; but this proved nothing. If he were to inoculate himself again, and twenty of his relations, I should be happy to know the result.³⁷

The mixed results of such inoculation processes led one medical scientist to suggest that no proof had been established either for or against the spontaneity of rabies.³⁸

While the exact physiological mechanism was still in doubt, most medical practitioners and scientists concluded rabies was primarily a neurological disease. One physician noted: "In hydrophobia there does not appear to be any great febrile action, but the nerves are principally affected. . . ." ³⁹ A second physician came to much the same conclusion. " My personel observations confirmed me in the previous idea. . . that hydrophobia is a disease specifically of the nervous system." ⁴⁰

³⁵ William Babington, "Canine Madness," Veterinarian III (1831): 686-90.

³⁶ Anonymous, " Hospital Reports, St. Bartholomew's Hospital, Hydrophobia," Lancet 10 (1826): 511.

³⁷ M. Elliotson, "A Case of Hydrophobia, and Remarks on That Disease," Veterinarian III (1831): 341-2.

³⁸ M. Lawrence, (1829/30), 617.

³⁹ M. Abernethy, "Surgical Lecutres, Hydrophobia," Lancet VI (1825): 396.

⁴⁰ A. T. Fayerman, "Hydrophobia Rabies," Lancet 6 (1825): 344.

Other scientists tried to explain the relationship between symptoms and pathological signs. Delabere Blaine believed the difference between furious and dumb rabies had to do with the organs attacked.

When the inflammation exists most in the bowels, it generally produces affection of the throat and neck. This affection consists in a trifling enlargement of all the parts around; The tongue hangs out, and from a partial paralysis of the muscles of deglutition, there is frequently a difficulty, but never any disinclination, to swallowing. It is this kind, from the dropping of the jaw, that sportsmen are led to call dumb madness.

On the contrary, when the lungs are the principal seat of the affection, there are usually much more quickness and irritation in the dog's manner. he rather barks, with a hasty and altered tone, than howls. He snaps at passing objects, and shakes his chain, or the vessels he drinks out of, with seeming violence.⁴¹

For all the controversy about the cause of rabies, little had been done to enhance the differentiation of this disease from other afflictions. The most prominent example of this problem was the belief that the Duke of Richmond, the Governor-General of Canada, had died in 1819 as a result of rabies.⁴²

The earliest reports about the Duke's death said nothing about his dying of hydrophobia. There was, though, some speculation as to the cause of his death. For example, the Kingston Chronicle wrote:

His Grace we understand felt the first attack on the way from Perth. The road to Richmond led through a low and marshy tract of country. . . and His Grace was consequently obliged to perform a considerable portion of the route on foot, traversing many swampy places where the water was upwards of two feet in depth. This exposure to fatigue and wet, added to the influence of a powerful sun, produced a fever, which affected his brain and in two days proved fatal.⁴³

The Quebec Gazette observed: "His anxious desire to visit new settlements, in which he has so laboriously persevered, has unfortunately been accompanied with severe and unavoidable

⁴¹ Blaine, 1817, 110-111.

⁴² John Blaisdell, " Rabies and The Governor General of Canada," Veterinary History 7 (1992): 19-28.

⁴³ Kingston Chronicle (Kingston, Ontario) 3 September 1819.

fatigue; which, with the sultry heat of the season, there is little doubt, has been the cause of his present illness."⁴⁴

It was not until October 1819, more than a month after the Duke's death, that references to hydrophobia were seen. The Acadian Recorder for October 2, 1819, stated: "Private letters from Quebec, we lament to state, mention that His Grace fell victim to that most dreadful of all disorders--the hydrophobia--having been bitten by a tame fox, which had been worried by the dogs, on his endeavoring to pacify it."⁴⁵ This article observed the Duke died a most horrible death. "Every symptom to which this agonizing and dreadful disorder is liable, is said to have become visible on the Monday preceding his death and his sufferings must have been more acute for the want of medical aid, and the repeated sight of waters became unavoidable on his route through the wilds of the interior."⁴⁶

While this newspaper did not go into details of the Duke's death the New Brunswick Royal Gazette does. The October 12 edition provided a detailed description of a demise attributed to hydrophobia. The first signs appeared approximately four days before his death. The paper noted: "While at dinner, he wished to drink wine with one of the party, he found he could not drink and that there was something offensive in the smell of the wine."⁴⁷ Soon after he became so horrified at the sight of water that he had to travel by foot instead of in a canoe. "He insisted upon proceeding by land, and, as he went on, every appearance of water on the road, threw him into agony."⁴⁸ The end came on Friday when after having caught sight of the river the duke ran off in horror into the woods.

He darted away till he gained a barn, where he threw himself down, and remained in great torture for some time, when his suite succeeded in removing him to a house, where he died the following morning. He, during his lucid intervals, declared his conviction he could not recover, desired he might be buried at Quebec, and gave directions upon some public measures.⁴⁹

This description supposedly came from a letter dated September 4, 1819. The Acadian Recorder also noted the description of the Duke's death came from letters. But who was/were

⁴⁴ Quebec Gazette (Quebec City) 2 September 1819.

⁴⁵ Acadian Recorder (Halifax) 2 October 1819.

⁴⁶ Ibid.

⁴⁷ New Brunswick Royal Gazette (St. Johns, New Brunswick) 12 October 1819.

⁴⁸ Ibid.

⁴⁹ Ibid.

the author(s) of these letters? The later accounts provide no real help. The only reference to a written description of this tragedy is that of a daily diary of a Mr. McElroy: "The Duke of Richmond died today, at Chapman's farm, 3 miles N.E. of Richmond." There was, though, from some of the newspapers a suggestion as to the author of one of the letters. It may have been no less than the Duke himself! In an article in the Kingston Chronicle for September 10, 1819 there was a description of the last moments of the Duke's life.

He bore his severe complaint with that unshaken fortitude which distinguishes the noble and true Christian spirit, retaining the full possession of his mental faculties to the last moment of his existence, and so aware was he of his approaching end, that he devoted a considerable portion of his last moments in writing a long letter to his daughter, Lady Mary, then in Montreal.⁵⁰

The above description suggests a stoic, rather reserved gentleman methodically putting his affairs in order, much in contrast to the hysterical semilucid individual who ran in horror through the Canadian woods. A second reference to the above-mentioned letter is seen in the December 8 Nova Scotia Royal Gazette. This notice claimed the Duke died of rabies as the result of being bitten by his pet dog. Moreover, the source of this statement was no less than the Duke himself.

An official dispatch from Charles Cambridge, Esq., . . . contains some particulars of the death of the Duke which prove incontestibly that he died of canine madness. Whilst he was suffering under this complaint, reason occasionally resumed her empire. He availed himself of these lucid intervals to address a letter to Lady Mary Lennox, in which he reminded her that a favorite dog, belonging to the household, being in a room at the Castle of St. Louis, at a time (five months before) when the Duke, shaving, cut his chin, the dog was lifted up, in order to lick the wound, when the animal bit his Grace's chin. The dog subsequently ran mad.⁵¹

Finally, there is the notice in the September 20, 1819 Quebec Gazette which refutes the belief that the Duke died of hydrophobia.

The report that the symptoms of hydrophobia, which preceeded the dissolution of his Grace, were in consequence of the bite of a dog, we find to be erroneous. It seems, indeed, to have risen from a mistaken idea that such symptoms can have no other origin, whereas it is well known to all professional men, that they were likely to result

⁵⁰ Kingston Chronicle (Kingston, Ontario) 10 September 1819.

⁵¹ Nova Scotia Royal Gazette (Halifax) 8 December 1819.

from the sort of exertion His Grace was actually making, in wading through swamps under intense heat.⁵²

The extant newspaper accounts of the Duke's death were confusing, often contradictory. One has the problem of the Duke on the last day behaving one minute like a raving madman and the next like a rational, methodical gentleman. Which of the two descriptions is correct? Is it possible that both are correct? In fact, the possibility exists that the Duke of Richmond just before his death was both hysterical and also perfectly rational. This would be particularly possible if he thought he was dying of rabies--in short if he suffered from hysterical rabies.

First, there is the problem of the pet fox. This would have been an excellent way to contract this disease if the animal had been rabid. The evidence suggests this creature was not. The Duke appears to have been bitten by the creature while it was in the process of defending itself against some aggressive dogs; this suggests the bite was accidental, due to the animal was defending himself. This might be considered justifiable biting.⁵³ hardly the act of a rabid animal. There is nothing in the records that notes what happened to the fox. This is a little curious since if the animal was rabid it would have made at least one of the Canadian newspapers. A headline such as "Duke of Richmond Bitten by Mad Fox" would probably have been seen.

One could suggest that the attack did not make the papers because of a lack of interest, an argument that seems highly unlikely. Rabies was hardly an unknown disease to the Canadian newspapers. The early Canadian newspapers covered in some detail the three cases of rabies that occurred prior to the death of the Duke of Richmond.⁵⁴ There were also numerous articles on the treatment of this disease⁵⁵ as well as extensive discussions on the control of the

⁵² Quebec Gazette (Quebec City) 20 September 1819.

⁵³ American Jurisprudence, 2nd edition, 83 vols. (San Francisco: Bancroft-Whitney and Co., 1962), vol. 4, 345.

⁵⁴ Blaisdell, Vet. Hist., 1992, 19-28.

⁵⁵ Quebec Daily Mercury (Quebec City) 16 December 1811; Quebec Daily Mercury (Quebec City) 23 October 1814; Montreal Gazette (Montreal) 2 September 1816; Quebec Gazette (Quebec City) 16 October 1817; Montreal Herald (Montreal) 21 March 1818; Montreal Herald (Montreal) 27 June 1818; Montreal Herald (Montreal) 15 August 1818; Acadian Recorder (Halifax) 15 August 1818; Montreal Herald (Montreal) 12 September 1818;

dog population in certain Canadian cities.⁵⁶ This same argument could be used to question the accuracy of the determination of rabies being the cause of the Duke's death. If he had died of this condition, some notice of it would have been seen with the initial dispatches that announced the Duke's death. A Maine paper had an article on hydrophobia no less than a month prior to the notice of the Duke's death yet never made any connection between the two events.⁵⁷

All this brings one back to the symptoms the Duke of Richmond exhibited just before he died. The most obvious was the hysterics caused in this individual at the mere sight of water. At least one newspaper notice believed the constant sight of water on this trip may have contributed to his death.⁵⁸ The inability of the Duke of Richmond to swallow appeared some five days before he died; it appears to have been limited to a certain wine. If his inability to swallow on Monday was due to rabies then the disease should have progressed rapidly and by Friday, if he was still alive, the Duke probably would have been unable to stand, let alone run hysterically through the woods. If not rabies, then what? What sort of neurological affliction still allows the sufferer to be slightly impaired but still lucid? Some newspapers allude to a fever that was acquired from the marshy region. Encephalitis, or meningitis, fit into this category. Probably, though, a series of mild strokes followed by a major one caused his death. The fact that some of the initial notices state "The Duke was suddenly taken ill on the road and died. . . early on Saturday morning" tend to reinforce this belief.⁵⁹

This case indicated that there still existed an immense amount of anxiety about this disease. Sometimes the concern became so intense that it led to death. Such was the case from England of James Summer Rades. Bitten in the summer of 1824 by a suspected mad dog Rades some four weeks later came down with what were considered the early symptoms of rabies. Over time he became so distraught that his behavior became both wild and incoherent.

Kingston Chronicle (Kingston, Ontario) 18 June 1819; Upper Canada Herald (Toronto) 22 June 1819; Upper Canada Herald (Toronto) 6 July 1819.

⁵⁶ Acadian Recorder (Halifax) 21 March 1818; Quebec Daily Mercury (Quebec City) 14 January 1817; Montreal Gazette (Montreal) 9 September 1818.

⁵⁷ Bangor Weekly Register (Bangor, Maine) 18 August 1819; Bangor Weekly Register (Bangor, Maine) 23 September 1819.

⁵⁸ Acadian Recorder (Halifax) 2 October 1819.

⁵⁹ Quebec Daily Mercury (Quebec City) 3 September 1819; Montreal Gazette (Montreal) 1 September 1819.

At one point a surgeon suggested Rades be forcibly restrained but before this could be done Rades committed suicide.⁶⁰ In spite of this case diagnosis was beginning to improve. One indicator of this was the disappearance in many medical journals of sure-fire cures for this disease. One physician summed up the therapeutics of rabies when he noted: "As to the treatment of hydrophobia I have nothing satisfactory to offer."⁶¹

In animals even greater improvements were seen; articles were now being published describing conditions that previously would have been mistaken for rabies.⁶² In 1823 the first description of pseudorabies in cattle was seen.⁶³ In swine conditions that earlier would have been considered hydrophobia were now attributed to parasites and ergot poisoning.⁶⁴ In horses, tetanus, a disease once frequently confused with hydrophobia, was now being accurately diagnosed and aggressively treated.⁶⁵ By far the greatest advances were in the ability to differentiate between rabies and canine and feline distemper.

By the middle of the nineteenth century numerous scientists, both medical and veterinary, had investigated distemper in dogs. One of the earliest to examine it in some detail was Edward Jenner. Jenner recognized the confusion of this disease with rabies.

That disease among dogs which has familiarly been called 'the distemper' has not hitherto, I believe, been much noticed by medical men. I availed myself of it (distemper) during several successive years, . . . and from observing how frequently it has been confounded with hydrophobia, I am induced to lay the result of my inquiries before the medical and chirurgical society.⁶⁶

Jenner identified the disease as an inflammation of the mucous membrane of the respiratory tract. "These membranes are oftne inflamed to such a degree as to occasion extravasation of

⁶⁰ London Times (London) 4 September 1824.

⁶¹ Abernethy, 1825, 396.

⁶² Anonymous, "A Singular Nervous Affection Resembling Rabies," Veterinarian IV (1831): 476-478; J. Conolly, "Case of Peculiar Symptoms following The Bite of A Dog Supposed to be Rabid," Veterinarian V (1832): 92-98.

⁶³ Anonymous, "Editorial Correspondence," American Farmer 5 (1823): 245-6.

⁶⁴ W. A. Cartwright, "Some Unusual Diseases of Swine," Veterinarian IV (1831) 425-6.

⁶⁵ J. Carver, "Veterinary Pharmacopoeia," Farrier's Magazine (1818): 112; E. Saunders, "Two Cases of Tetanus Successfully Treated," Veterinarian I (1828): 276-9.

⁶⁶ Jenner, 1809, 265.

blood". He also recognized a neural component which, along with the respiratory problems, was responsible for many of the symptoms similar to rabies.

The brain is often affected as early as the second day after the attack. The animal becomes stupid and his general habits are changed. His jaws are generally smeared with the excessive mucus of his trachea and fauces, and it sometimes flows out in a frothy state, from his frequent champing. He has sometimes epileptic fits, or quick successions of general, though slight, convulsive spasms of the muscles.⁶⁷

Jenner summed up the often seen confusion between rabies and distemper by noting that much of the belief in rabies in dogs was due more to an overactive imagination than to the disease itself.⁶⁸

Jenner's beliefs about distemper were to some extent mirrored by Youatt. He recognized it as a disease primarily affecting the respiratory tract but that it could also attack the gastro-intestinal tract and/or the nervous system. Youatt also noted a number of signs and symptoms, especially neural ones, that could be used to differentiate between distemper and rabies.

We may be enabled to distinguish between rabies and distemper. When a person unacquainted with dogs sees one of these animals struggling in a fit, or running along unconscious of every surrounding object, or snapping at everything in his way, . . . he raises the cry of 'mad dog' and the poor brute is immediately sacrificed. The very existence of a fit is proof positive that the dog is not mad. No epilepsy accompanies rabies in any stage of that disease.⁶⁹

Blaine's comments were less comparative. In his early writings he made no mention of a comparison of this affliction with rabies. Blaine did go into great detail as to the great variability in the symptoms.

The distemper commences its attack in various ways ; in fact, it is a disease that, in its rise, appearances, progress, duration and termination, exhibits more varieties than any other complaint. The varieties are immense. In some the disease is very long, even many weeks, before it arrives at its height; in others, it appears in full force in a few days after it makes its attack.⁷⁰

⁶⁷ Jenner, 1809, 265-7.

⁶⁸ Jenner, 1809, 269.

⁶⁹ William Youatt, "On The Distemper of Dogs," Veterinarian III (1830): 78-9.

⁷⁰ Blaine, 42-43.

He noted the disease could be manifested by a acute fever, convulsions and even an eruption on the skin. Blaine further observed that, in the case of convulsions, there could be two different varieties seen: one involving spasmodic twitching, the other convulsions.⁷¹ Despite these symptoms, he never discussed the possible confusion of this disease with rabies.

The articles on distemper not only outlined the symptoms seen but also the treatments. Everything from common salt to mercuric chloride and turpeth mineral was suggested.⁷² One article even noted a that vaccination for smallpox might also provide protection to canine distemper.⁷³ Notices were also seen describing outbreaks of distemper. Feline distemper initially seems to have been more prevalent than its canine component.⁷⁴ With the increasing recognition, the confusion between rabies and distemper decreased concurrently.

For all the advances in cause and diagnosis of rabies little was being achieved in the area of treatment. Most of the medical therapeutics harkened back to the eighteenth century. Occasionally new twists were put on to old treatments, some mild, some not so mild. The process of immersion in water developed into a less invasive sweat bath while excising the bitten part took on the far more severe form of limb amputation.⁷⁵ At least two new means of

⁷¹ Blaine, 45-6.

⁷² Anonymous, "On The Management of Horses and Dogs," American Farmer 5 (1823): 69; William Youatt, "Illustrations of The Distemper of Dogs," Veterinarian II (1829): 287-91; Anonymous, "A Recipe to Cure Dogs of The Distemper," American Turf Register and Sporting Magazine 1 (1829): 77; J. D., "The Distemper," American Turf Register and Sporting Magazine 1 (1830): 296; W. Youatt, "Veterinary Lectures, Distemper in The Cat," Veterinarian V (1832): 338; Anonymous, "The Dog Distemper," American Agriculturalist (1849): 206; Anonymous, "The Dog Distemper Again," American Agriculturalist (1849) 208.

⁷³ J. S. Skinner, "Vaccination of Dogs-Will It Prevent 'The Distemper?'" American Farmer III (1821): 309.

⁷⁴ Anonymous, "Medical News, Domestic," Medical Repository I (1798) 255; Anonymous, "Medical News, Domestic," Medical Repository I (1798) 381; Anonymous, "Monthly Report of Diseases," Veterinarian VI (1833): 340.

⁷⁵ Anonymous, "The Cure of Hydrophobia by The Vapour Bath," Veterinarian VII (1834) 290-91; Anonymous, "Case of Hydrophobia, Occuring Seven Weeks Subsequent to The Bite of A Dog, on The Left Hand Amputation of The Arm after The Accession of The Disease," Lancet 12 (1826/7) 155-7.

treatment made their appearance in the nineteenth century--one involved fluid replacement therapy while the second took advantage of a new form of alternative medicine, homeopathy.

Fluid injection first appeared in 1824. A French physician named R. Magendie treated a man suffering from hydrophobia by injecting water into his veins. He noted that after he injected two pounds of water the patient's symptoms dissappeared and he appeared to get better. Five days later the patient became ill again; his condition quickly deteriorated and he died eight days after being treated. (An autopsy revealed an abscess on the patient's foot, where he had been repeatedly bled, so cause of death may have been septicemia.)⁷⁶ This was not the only patient Majendie treated in this manner. He also treated a black poodle suffering with rabies. The treatment, though, did nothing to abate the symptoms and the animal died within a day. Another French doctor tried this treatment on an individual bitten by a wolf. B. Gaspard injected only four ounces before the patient began to complain of nausea, vertigo and began to shiver and tremble violently. At that point he stopped. The patient died within a day of being treated.⁷⁷

Despite the initial failure of this therapy others considered it to have possibilities. One prominent physician, Sir Astley Cooper, noted: "The only thing in the way of medicine (for treating rabies) that I think is calculated to do good, is that which has lately been adopted in France, viz., the injection of warm water in to the veins."⁷⁸ Others attempted to use water treatment, with no success.⁷⁹ This collective lack of success did not help the treatment's reputation and almost as quickly as it rose to prominence it fell from grace.⁸⁰ In 1828 a German physician tried to treat hydrophobia with blood transfusions, with no more success than the earlier water injections.⁸¹

⁷⁶ R. Magendie, "History of A Case of Hydrophobia Treated at The Hotel Dieu, at Paris, by An Injection of Water into The Veins," Lancet 1 (1823/4) 345-51.

⁷⁷ B. Gaspard, "Trial of The Injection of Warm Water into The Veins in A Case of Hydrophobia," Lancet 3-4 (1824): 367-73.

⁷⁸ Sir Astley Cooper, "On Poisons-Hydrophobia," Lancet 3-4 (1824): 166.

⁷⁹ Anonymous, "Hydrophobia-Injection of Water," Lancet 18 (1830): 798-99.

⁸⁰ Charles W. Dulles, "The Treatment of Hydrophobia, Historically and Practically Considered," Journal of The American Medical Association III (1884): 174 ; K.Codell Carter, "Nineteenth-Century Treatments for Rabies as Reported in The Lancet," Medical History 26 (1982): 71.

⁸¹ Anony., "Transfusion," Lancet 15 (1828/9): 232.

If water injection proved only fleetingly popular another process remained popular for decades--homeopathic therapeutics. A medical philosophy first advocated by a German physician named Samuel Hahnemann, homeopathy based therapeutics on two beliefs. First, like cures like--if one has a fever one is given a treatment that causes a condition comparable to that fever, thus curing the original fever. Second, the more dilute the medicine the more efficacious it will be. Hahnemann, using these beliefs, advocated belladonna atropia as an effective therapy for rabies because of the similarity in the signs with this disease and belladonna poisoning. He further suggested this medicine be diluted as much as 1 /1 billionth of a dose, thus making the poison all but innocuous. He wrote:

It is probable that the deadly nightshade (atropia belladonna) will be useful Whether its power over hydrophobia, if it does possess any, depends on the latter property alone, or also on the power of suppressing palliatively, for several hours, the irritability and excessive sensitiveness that are present in so great a degree in hydrophobia, I am unable to determine.⁸²

Belladonna was not the only homeopathic means of treatment. Also advocated was saliva from mad dogs diluted with alcohol. Called hydrophobin or Lyssin, the medicine was endorsed by the American leader of homeopathic medicine, Constantine Hering. Trained in Germany, Hering moved to Pennsylvania in 1831. Four years later he established the first school of homeopathic medicine in the United States--The North American Academy of Homeopathic Healing.⁸³ In his personal writings Hering noted treating patients with hydrophobin or lyssin ; he even treated his son Max after he was bitten by a mad dog.⁸⁴ The major success of homeopathic medicine was as a placebo for individuals suffering from hysterical rabies or high anxiety about coming down with the disease. Hahnemann observed: "It is well known that of persons bitten, nay, lacerated by dogs really mad, it is very far from the case that all will be affected by hydrophobia"⁸⁵. In at least one case homeopathic success

⁸² R. E. Dudgeon, The Lesser Writings of Samuel Hahnemann (New York: Privately Printed, 1852), 273.

⁸³ Dumas Malone, ed., Dictionary of American Biography, 11 vols. (New York: Charles Scribner's sons, 1932), vol. VIII, 575; The National Cyclopedic of American Biography, 63 vols. (New York: James T. White and Co, 1893), vol. III, 477.

⁸⁴ Calvin B. Kneer, Life of Hering (Philadelphia: Magee Press, 1940), 131-2.

⁸⁵ Dudgeon, 390.

can not be attributed to hysteria. An individual who practiced veterinary homeopathy used a mixture of Hyosciamus to successfully treat seizures in a dog.⁸⁶

If attitudes towards treatment had matured by the second half of the nineteenth century those toward prevention had grown more emotional. This change was due to a number of factors. The most important was a dramatic rise in dog ownership in all levels of society and the consequent rise of a major industry to deal with the needs of these new owners. Dogs were also seen not only as companions but also as reflections of their owners' social status, an attitude that would give rise to increased popularity in purebred dogs.⁸⁷ The best indicator of the dog population explosion comes from late nineteenth-century tax records. From 1867 to 1878 the number of licensed dogs in the United Kingdom rose from 830,000 to 1,300,000. This increase was at a time when license fees rose from 5s to 7s 6p.⁸⁸ (Remember the good ole days of the 1790s when fees were 3p.)

An increase in numbers in middle and upper middle class dogdom was reflected by a concurrent rising interest in dog breeds and dog shows. One historian noted:

There was a steady growth in the ownership of less exotic dogs among the respectable middle classes; and it was these professional, commercial and trading groups who probably accounted for a large proportion of the increase in licensed dogs. The well-bred dog was thus becoming an investment, and the market for pedigree animals developed rapidly among those who could afford the rising prices. The dog was becoming a status symbol, too, and his rising prestige probably did much to stimulate an expansion in the numbers of less exalted dogs further down the social scale.⁸⁹

At much the same time there developed a parallel attitude towards mongrel dogs. As the well-bred dog rose in status the mongrel dog, and his lower-class owner, fell. Among the respectable classes the mixbred dog was seen as 'useless and miserable, in short nothing but rubbish.'⁹⁰

⁸⁶ W. Haycock, "Veterinary Homeopathy-Case 3: Convulsions in A Dog," American Journal of Homeopathy 8 (1853): 59-60.

⁸⁷ Harriet Ritvo, The Animal Estate (Cambridge, Massachusetts: Harvard University Press, 1987), 85.

⁸⁸ John K. Walton, "Mad Dogs and Englishmen : The Conflict over Rabies in Late Victorian England," Journal of Social History 13, no. 2 (1979): 221.

⁸⁹ Walton, 222.

⁹⁰ Ritvo, 91.

These attitudes had a major influence on the way rabies was dealt with in nineteenth-century metropolitan England. Rabies had been on the increase since the beginning of this century. In 1828 The Registrar-General Report listed 28 people in England dying of rabies.⁹¹ By the 1840s it became serious in London; a surgeon named Caesar Hawkins noted that in 1844 no less than thirteen London deaths were attributed to this disease.⁹²

By the 1860s rabies had become so serious that national efforts were being made to deal with it. These efforts concentrated mainly on strays and lower-class mongrel dogs. One of the first, introduced in London, was the Metropolitan Street Act of 1867. It required muzzles to be worn by all dogs when in polite society and also gave the authorities the power to seize and destroy all vagrant dogs.⁹³ In 1871 this measure was imposed throughout the United Kingdom. Rabies decreased for a while but reappeared with a vengeance in the 1870s. In 1874 no less than 74 deaths were attributed to rabies in Great Britain. Then in 1877 seventy-nine people died. In the words of one historian: "The British rabies problem had become serious."⁹⁴ Another historian observed, though, that the average English citizen was ten times more likely to be murdered as to die of hydrophobia.⁹⁵

The increase in human deaths led to dramatic, often draconian measures of control. Much of the problem was an inability, or unwillingness, to enforce the existing laws of muzzling and stray-dog control. The early muzzling laws were enforced by justices of the peace, a measure that was ineffective at best. In the 1880s new statutes were introduced which imposed compulsory muzzling and removal of strays by law enforcement authorities, such as the local police. Unfortunately for some pet owners, a stray was any unmuzzled dog. For example in August 1886 no less than 2,898 stray dogs were seized by the police in London. Of these a total of 53 showed symptoms comparable to rabies.⁹⁶ In October of that year 2,157 dogs were removed from London streets. Twenty-two additional animals were killed as rabid, nineteen by the police and three by private citizens. All twenty-two were examined by a veterinary surgeon and he determined the cause of their rabid was as follows:

⁹¹ James Steele, "History of Rabies," in The Natural History of Rabies, ed. George M. Baer, 2nd.ed. Boca Raton: CRC Press, 1991), 5-6.

⁹² Thomas Watson, "Hydrophobia and Rabies," The Nineteenth Century X (1877): 717-8.

⁹³ Ritvo, 190 ; Steele, 9.

⁹⁴ Steele, 10.

⁹⁵ Ritvo, 169-70.

⁹⁶ Anonymous, "Dogs in London," The Veterinary Journal 23 (1886): 229.

rabies	3 dogs
epilepsy	13 dogs
brain fever	2 dogs
convulsions	1 dog
peritonitis	1 dog
poisoning	1 dog

and one dog was taken away before he could be examined. It was determined seventy-seven people: sixty-five private citizens and twelve policemen, were bitten by dogs *not* known to be rabid.⁹⁷ Obvious hysterical rabies was as prevalent, if not more so, than rabies. In 1889 a new statute exempted from the stray dog category any animals wearing collars or tags which could identify their owners.⁹⁸

In American cities the situation was equally serious. Since the beginning of the nineteenth century the stray dog population had been viewed not only as a nuisance but as a public health concern. New York City in 1811 passed a law prohibiting dogs from running at large, the first time such a statute was seen without an accompanying outbreak of rabies. In 1814 after a child died of this disease, New York citizens engaged in an indiscriminate campaign of dog-killing. The only complaint from this dog-purge involved dumping dog carcasses in public areas, creating a foul, disgusting mess.⁹⁹ In 1849 Boston responded to an outbreak of rabies with a dog-killing epidemic as well.¹⁰⁰ At much the same time New York City introduced two new measures to deal with rabies. The first was a law which required the licensing of all dogs while the second was the offer of a \$5.50 bounty for any stray dog killed in the city. This bounty system existed on and off for the next twenty years. More than a few citizens found it questionable. One newspaper noted "young boys scarcely so tall as the far nobler and more intelligent quadrupeds they assailed, went about the streets during the summer, staggering under clubs as heavy as themselves, striking down and then horribly mangling with many blows every dog they encountered."¹⁰¹

⁹⁷ Anonymous, "Rabies and The Police Gazette," The Stock-Keeper and Fancier's Chronicle, 12 November 1886, 323.

⁹⁸ Ritvo, 191; Walton, 229.

⁹⁹ John Duffy, A History of Public Health in New York City, 1625-1866, 2 vols. (New York: Russell Sage Foundation, 1968), vol. 2, 216.

¹⁰⁰ Bangor Daily Whig and Courier (Bangor, Maine) 19 February 1849, 2 March 1849.

¹⁰¹ New York Daily Tribune (New York City) 3 October 1849; Duffy, 387.

Change came in the 1880s and 90s with Pasteur and his work on rabies. One of the first achievements was an effective means of treating people and animals bitten by rabid animals. The therapy, taking advantage of the time lag between being bitten and when the symptoms appeared, slowly built up the antibodies to the rabies virus until two weeks after the initial treatment one was generally immune to the disease. The major problem with this treatment was not all animals who bit were rabid. As a result the initial results were somewhat inflated positively. It was from these less-than-accurate results that one of the first definitive diagnostic tests was developed. The development of such a test started with an outbreak of rabies in Newark, New Jersey, U. S. A.. The Newark Dog Scare started on the morning of December 2, 1885 when a large black dog attacked and bit six children in Newark, New Jersey. Soon after the animal, described as 'foaming at the mouth' was chased down the street and eventually cornered on the steps of a building where he was shot to death.¹⁰² The children who were bitten were initially treated by Dr. A. E. Osborne. By the next day they were under the care of Dr. William O'Gorman, a well-known Newark physician, who immediately contacted each of the youngster's parents, advising they be sent to Pasteur in Paris. Additionally he sent the following telegram to Pasteur:

Newark, New Jersey, Dec.3

Three children bitten by dog supposed to be mad. Dog prematurely killed. Will you take charge of children sent to Paris? I have head and spinal column of dog supposed to be rabid. If requested will forward.

Answer.

William O'Gorman.¹⁰³

It was only after he sent the telegram that O'Gorman determined six, not three, children had been bitten. The statement of the animal's premature death was not the only time O'Gorman worried about the confirmed diagnosis of rabies. In his public appeal for funds to transport the youngsters to Paris O'Gorman expressed regret that the animal was not captured alive so its madness could be established beyond doubt, a factor that proved pivotal to this case. On December 4 the following reply was received from Pasteur:

Si Croyes Danger, Envoyes Enfant Immédiatement Pasteur

¹⁰² New York Herald (New York City), 3 December 1885; New York Times (New York City) 3 December 1885.

¹⁰³ New York Times (New York City) 4 December 1885; New York Herald (New York City) 4 December 1885.

Despite the positive response from Pasteur and the successful effort to raise money for transportation only four of the six children actually sailed for Paris. The main reason for the other two staying behind was that the parents of one child refused to let him go while the parents of the second child were advised by their physician that the disease could be treated at home.¹⁰⁴

While the initial response with respect to the treatment of the bitten children was fairly measured, the response with respect to the dog population was anything but. Almost immediately a general hysteria seemed to grip Newark. All the dogs that were known to have been bitten by this particular dog were rounded up and killed. Not all the bitten animals came forward at this time, though; at least seven escaped this initial round up and later ended up in one of the quarantine stations where they were kept until March 1886. Furthermore, a demand was made that all dogs be muzzled and the police authorized to shoot all unmuzzled dogs. By December 5 the "epidemic" had spread beyond Newark; it was now being reported that mad dogs were 'ravaging' Morris County, New Jersey.¹⁰⁵ Headlines such as "Newark's Rabid Dogs", "In Terror of Hydrophobia" and "Newark's Dog Plague" did little to calm the hysteria.

Despite this, efforts were made to bring order out of chaos. It was suggested by members of the medical community that the stray dogs be caged so as to determine positively if they had rabies. More importantly, the police quickly came under attack for their indiscriminate killing; reaction in some places was so severe that when one officer tried to substitute poisoning for shooting, a number of the dog owners threatened to shoot him.¹⁰⁶ Reactions like this both in the street and in the press forced the police to replace killing with impounding. Very quickly dogs appeared in the hydrophobia experimental quarantine station set up in Newark, including a number of dogs that had supposedly been bitten by the original dog. By December 10 there were at least seven of this latter category, one of which was supposedly

¹⁰⁴ New York Herald (New York City) 5 December 1885; New York Herald (New York City) 6 December 1885; New York Times (New York City) 6 December 1885; New York Herald 7 December 1885.

¹⁰⁵ New York Herald (New York City) 5 December 1885; New York Times, 4 December 1885.

¹⁰⁶ New York Herald (New York City) 4 December 1885; New York Herald (New York City) 7 December 1885.

beginning to show signs of rabies.¹⁰⁷ For the rest of December the hysteria was confined mainly to the newspapers with their daily litany of mad dogs, suffering patients and vain attempts by the police to round up the population of 'mongrel curs'.

Now the articles began to discuss ways to prevent rabies from spreading. Probably the most popular solution was the drastic culling of the stray dog population. One author noted: "One human life is worth more than all the dogs in the country", while another wrote: "when we are called upon to choose between the child of the poorest man in the city and a thousand dogs, every humane motive prompts me to say 'kill the dogs.'" A further article began with the headlines: "HALF A MILLION DOGS" and then asked the question: "Why not lessen the number?" Other, more moderate, individuals suggested that there should be a dog tax and that all dogs out in public should be muzzled.¹⁰⁸

By January 1886 the newspaper articles on the plague of dogs were being replaced by articles on Pasteur's method of treatment. Some compared the treatment of the Newark children with that of the children from Tourcoing, near the Belgian border of France, that had been bitten by a mad dog. The authors in a slightly less-than-subtle manner noted that of the three French children bitten only one, the most severely bitten, was treated by Pasteur; the other two stayed home. Sadly they had died while the one who went to Pasteur was still alive. More encouraging was the news of January 3--the Newark children, as they had come to be known, were finished with their treatment and were on their way home¹⁰⁹; the youngsters arrived on January 14 much to the relief of their parents. So far Pasteur's therapeutics had been a roaring success.

¹⁰⁷ It was later discovered that the animal in question had a .32 caliber bullet lodged near the base of his brain, a fact that caused the veterinary officer, Dr. Runge, to respond: "I think that ought to make any animal of ordinary vitality very sick." see: New York Herald (New York City) 8 December 1885; New York Times, 24 December 1885; New York Times (New York City) 29 December 1885; New York Herald (New York City) 10 December 1885.

¹⁰⁸ New York Herald (New York City) 16 December 1885; New York Herald (New York City) 17 December 1885; New York Herald (New York City) 27 December 1885; New York Herald (New York City) 18 December 1885; New York Herald (New York City) 17 December 1885.

¹⁰⁹ New York Herald (New York City) 1 January 1886; New York Herald (New York City) 3 January 1886; New York Times (New York City) 3 January 1886.

At this point problems arose. First was the announcement on March 1 that no confirmed cases of rabies had appeared in any of the seven dogs that had supposedly been bitten by the dog that bit the Newark children. Next was the report of a Russian, bitten by a mad wolf, dying in spite of Pasteur's treatment. This was followed by the report of a second and a third Russian death, all suggesting that Pasteur's treatment was not 100% effective.¹¹⁰

That seven dogs plus the two uninoculated children were still alive helped reinforce the complaint by many in the American medical and veterinary communities that Pasteur's treatment was only effective when there was no rabies to begin with. One of the first to note this was Hermann Biggs. Biggs, remembered mainly for his monumental work in public health in New York City in the early twentieth century, was born in 1859 in Western New York State. After attending Cornell University, Biggs went to Bellevue Medical College where he received instruction in bacteriology. This field was so new that it was not taught as a separate subject but as an adjunct to pathology. Biggs was lucky in that his pathology teacher, William Henry Welch, had recently returned from Europe where he was exposed to the fields of cellular pathology by Rudolph Virchow and bacteriology by Robert Koch. In 1886 Biggs was one of the best trained Americans in the new field of bacteriology.¹¹¹

Biggs pointed out that the Newark Dog Case had not proved Pasteur's theory one way or another.

Six children and a number of dogs were bitten by the same dog, supposed to be rabid. The animal was immediately killed, but a number of the bitten dogs were placed under confinement. . . . Four of the children were sent to Paris and were treated by M. Pasteur; the two others remained at home. In this case the dogs which were bitten and placed under confinement, and the two children which remained at home, served as a control on those inoculated, but, inasmuch as more than ninety days have elapsed since the accident and neither the

¹¹⁰ New York Times (New York City) 1 March 1886; New York Times (New York City) 26 January 1886; New York Times (New York City) 24 March 1886; New York Herald (New York City) 25 March 1886.

¹¹¹ C.E.A. Winslow, The Life of Hermann M. Biggs, M.D., D.Sc., L.L.D. (Philadelphia: Lea and Febiger, 1929).

uninoculated children nor the dogs bitten have developed any symptoms or rabies, the probable result is evident.¹¹²

The 'result' Biggs was referring to was the lack of rabies in these individuals, leading him to believe that the four inoculated children also lacked this disease.

Biggs was not the only one who observed this. It also came to the attention of Dr. Frank Billings, a devoted fan of Pasteur. Frank S. Billings, long the gadfly of the American veterinary profession, was born in Massachusetts in 1844 and obtained his veterinary degree in Berlin in 1878. Billings was well known for his caustic attacks on the veterinary profession, so much so that in 1890 he was expelled from the United States Veterinary Medical Association for ungentlemanly behavior. Despite this Billings was an advocate of strong public health measures; he wrote extensively on diseases such as glanders, hog cholera, and rabies. Billings noted that the incidence of rabies in humans bitten by mad dogs was about 50%.

"Leaving all treatment of the wound out of the question, it is known that by no means 50 percent of the persons bitten by rabid and suspected dogs acquire the disease. . ." ¹¹³

Biggs and Billings did not blame Pasteur for this problem. Not so this last author, E.C. Spitzka was an attending physician in the Department of Nervous Diseases of the German Poliklink and an individual who questioned Pasteur's results in his rabies research. Very vitriolic toward Pasteur, Spitzka believed the former's work was responsible for all those that had died of rabies in the previous year. With respect to Rabies he came to three conclusions.

- I. There is at present, no proven epidemic of hydrophobia either in New York City or in its vicinity.
- II. A number of deaths have occurred from spurious hydrophobia (lyssophobia) in New York City and its vicinity during the past nine months.

¹¹² Biggs, "The Etiology of Rabies and the Method of M. Pasteur for Its Prevention," American Veterinary Review 10 (1886): 221; Hermann Biggs, "The Etiology of Rabies and The Method of M. Pasteur for Its Prevention," New York Medical Journal xLiii (1886): 342.

¹¹³ J.F. Smithcors, Evolution of the Veterinary Art, (Kansas City: Veterinary Medicine Publishing Co., 1957), 398-400; Billings, " Rabies in the Dog in Its Relation to Rabies in Man, with Especial Reference to its Prevention and to Pasteur's System of Preventive Inoculation," Journal of Comparative Medicine and Surgery 7 (1886): 167.

III. The agitation of the subject of Pasteur's method of preventive inoculation for hydrophobia, and the accompanying accounts of suffering and death from that disease, are responsible for those deaths.¹¹⁴

The main problems with Pasteur's treatment were that not all the cases of suspected rabies would eventually turn rabid and that not all individuals bitten by rabid animals would develop rabies. While there was nothing the medical or the veterinary profession could do to determine who would eventually develop rabies there was a new diagnostic test that could be used to determine which dogs were rabid. While not 100% effective it was still more accurate than reliance on symptoms alone. Moreover it also allowed for the situation, such as occurred in Newark, where the suspected mad dog was killed long before the disease had run its course. The individual responsible for this test was none other than Pasteur. The process involved the injection of material from the brain of a suspected animal into that of a non rabid animal. Pasteur himself noted this test as a method of diagnosis. When asked what value the brain and spinal cord of the Newark dog were Pasteur stated:

None whatever. They would arrive here in a state of putrefaction and only be thrown away. Either the dog was mad or not mad. . . . At all events it could be determined with certainty by simply inoculating other dogs or other animals with the virus from the Newark Dog's brain. This could be done in Newark as well as Paris, but it would take a long time, and meanwhile if the treatment of the children be delayed they might die of hydrophobia.¹¹⁵

Dr. O'Gorman did try this procedure in Newark. Evidence suggests that it did prove that the Newark dog had rabies. A reference from a March 3 New York Herald article, mentioning the release of the suspected dogs, stated that a rabbit had recently been inoculated with the virus of a dog that had recently died of rabies. Whether the rabbit in question was inoculated with the virus from the Newark dog or from a later animal, the fact remains that Pasteur's method of determination of rabies by inoculation was already being practiced. Dr. Runge, the veterinarian who supervised the hydrophobia experimental quarantine station in Newark had by December 30 used this procedure to attempt a confirmed diagnosis of rabies in a dead hound. Runge stated: "We will take the brain and spinal marrow of this dog and

¹¹⁴ E.C. Spitzka, "How Can We Prevent False Hydrophobia?" Journal of Comparative Medicine and Surgery 7 (July 1886): 253-55.

¹¹⁵ New York Herald (New York City) 8 December 1885.

inoculate rabbits with it and produce the mitigated virus if possible after the method of Pasteur."¹¹⁶

While there had been a great deal published in the newspapers about trials using Pasteur's inoculation test the professional journals had no such references. Except for Dr. Runge the veterinary profession appeared to be more than a little reticent about employing Pasteur's methods of diagnosis and treatment. Enter Alexander Liautard. Liautard, head of the American Veterinary College in New York City and one of the editors of the American Veterinary Review, was also well informed about the latest advances in rabies diagnosis and treatment. It was Liautard who introduced Pasteur's method of cerebral inoculation as a test for rabies to the veterinary community.¹¹⁷ He did it through an incidence of rabies that became known as the Riverdale Dog Case.

This particular case of rabies occurred on April 14, 1886 when Amelia Morosini was bitten by a dog in Riverdale, New York. What made this case so interesting to the press was the identity of the victim; Amelia Morosini was the daughter of Mr. G.P. Morosini, a very successful stockbroker and the one-time partner of Jay Gould. Because of her notoriety Miss Morosini's case quickly received the attention of prominent men, such as Alexander Liautard. Because there was some question as to whether the animal was rabid Liautard performed a post-mortem on the remains of the dog. Liautard also attempted to confirm the diagnosis through Pasteur's inoculation method. Mr. Morosini did not wait for the final results but quickly took his daughter to Paris where she was treated by Pasteur. When she returned to New York on June 13 the New York Herald treated her arrival in a matter-of-fact manner, taking more notice of her new Parisian attire than of the disease she was treated for.¹¹⁸

If the case itself proved routine the controversy about the method of diagnosis was anything but. This case was outlined in a June 1886 article in the American Veterinary Review. The author was Dr. James Walrath, the house surgeon at the American Veterinary College of New York. In describing the post-mortem, Walrath noted the lesions seen were sufficient for a diagnosis of rabies even though, much like those from other cases, they were at best vague. It

¹¹⁶ New York Herald (New York City) 30 December 1885; 3 March 1886.

¹¹⁷ For an excellent discussion of Liautard and his contributions to the American veterinary profession see: Smithcors, 319-20.

¹¹⁸ New York Herald (New York City) 16 April 1886; New York Herald (New York City) 19 May 1886; New York Times (New York City) 20 April 1886; New York Herald (New York City) 13 June 1886.

was probably these generalized lesions that prompted Liautard to perform the inoculation procedure. Walrath noted: "It was thought to be expedient, in view of the present advanced condition of medical science, to institute a further test, as confirmatory or otherwise, of the diagnosis which had been already reached." An extract of the brain of the suspected animal was injected into the cranial cavity of an anesthetized dog. Sixteen days later, on May 1, the injected animal began to show signs of dumb rabies. These symptoms increased until the animal died two days later on May 3.¹¹⁹

Approximately one month later very strong criticism for this particular procedure appeared in an article in the Journal of Comparative Medicine and Surgery. The author, Spitzka, was convinced that most, if not all, of the so-called rabies cases were in fact cases of "hysterical rabies". He further believed that the constant attention Pasteur received in both the professional and the popular press only exerbated this social phenomenon. In the January 6, 1886 New York Herald Spitzka was quoted as stating that public excitement over Pasteur's methods had recently led to three cases of 'insane hydrophobia fear'.¹²⁰

Spitzka saved his strongest remarks for his July article. He wrote here that the hysteria over Pasteur's work was probably responsible for more deaths from rabies than the disease itself. Spitzka was just as harsh with respect to Liautard and his inoculation procedure. He all but denounced it .

The method of demonstrating rabies by direct inoculation of the brain is fallacious. The conclusion drawn by Liautard, from the experiment thus performed, that the Riverdale Dog was mad, was obtained by misleading methods.

Spitzka believed foreign substances injected into the meninges of the brain would cause inflammatory disturbances, the symptoms of which would be very similar to those of rabies. He injected into the brains of dogs such substances as calf and human neural tissue and even soap. All three appear to have produced in animals symptoms similar to that seen in the dog injected with the Riverdale Dog's neural tissue.¹²¹

Unfortunately for Spitzka the veterinary comments on Liautard's work were far more favorable. In August 1886 an editorial appeared which was more critical of Spitzka than

¹¹⁹ James A. Walrath, "Cerebral Inoculation as A Means of Diagnosis in The Post-Mortem of Rabid Animals," American Veterinary Review 10 (1886): 120-22.

¹²⁰ New York Herald (New York City) 6 January 1886.

¹²¹ Spitzka, 1886, 245, 260-63.

Liautard. While the author noted the cerebral inoculation of foreign substances could lead to meningeal disturbances, the symptoms of which were similar to rabies, he felt Spitzka had come to too many conclusions from his work. "To affirm the fallacy of cerebral inoculation from these premises is to take a great liberty with the facts and the logic of the case, and is taking quite too wide a stride in reach of a conclusion." With respect to Liautard's work the only complaint was not enough trials had been performed to assure the test was accurate. The author wrote:

Let the experimenters who have come to this rather hasty conclusion repeat their experiments a sufficient number of times, no longer with foreign substance, but with fresh material obtained from a rabid or suspected rabid animal.¹²²

Most of the medical and veterinary practitioners, believing this test could be used to confirm diagnosis of this disease, took this point of view. Very quickly cerebral inoculation was accepted as the standard procedure in confirming diagnosis of rabies. Indeed, Dr. Spitzka was involved with such a test. This occurred as a result of Jacob Hertlein, a New York City builder, supposedly dying of rabies on May 14, 1886. A careful post-mortem examination led a number of medical experts, including Spitzka, to believe this individual had died of rabies. To confirm this diagnosis parts of Hertlein's brain and spinal cord were injected into a number of rabbits with the result that at least one of these animals came down with, and eventually died of, dumb rabies.¹²³ Thus in the ultimate irony Spitzka became a somewhat peripheral participant in the inoculation process of which he had earlier been so critical.

Many of the cases of rabies noted in the American veterinary literature after Liautard's work with this disease involved animal inoculation tests as part of the diagnostic methodology for this disease. For example, Rush Shippen Huidekoper in 1899 described a procedure in which a sample of spinal cord from a rabid animal was injected into the neck of a sound dog, producing rabies in that animal in nineteen days. Another article described research that closely approximated Pasteur's, including his inoculation procedures. In a third article the author stated that while he still believed rabies could be diagnosed from symptoms alone animal inoculation should be employed for confirming that diagnosis. "After searching the history of a

¹²² Anonymous, "Cerebral Inoculation in Doubtful Cases of Rabies," American Veterinary Review 10 (1886): 203.

¹²³ New York Herald (New York City) 8 June 1886, 9.

case thoroughly, and carefully considering the objective symptoms, an expert can generally diagnose a case of rabies, although many cases will demand the animal inoculation test."¹²⁴

By this time such procedures were at a clinical level. This seems particularly evident at the agricultural veterinary medicine. Such procedures were often limited by the proximity of cases to a diagnostic laboratory; for example in an outbreak of rabies in Iowa in 1888 the veterinarians were unable to perform even post-mortems on the animals. Nevertheless, the number of cases in which this test was employed was increasing. Frank Billings, who went from Newark, New Jersey to Nebraska in 1886, used this test there to confirm a diagnosis of rabies. A veterinarian named Harrison employed this procedure to determine that a Durham cow had the affliction, while a veterinary student from Ohio used it to diagnose the presence of rabies in a Jersey heifer.¹²⁵

This test was also seen in equine and small animal medicine, especially if the outbreaks were severe or if humans were involved. There is the case of the gentleman farmer named Reed who was bitten by his horse. Rabbits were inoculated to confirm the diagnosis of rabies here. Reed though did not wait for the confirmation but left immediately for Pasteur. Finally, there is the description of a case of rabies in a fox terrier which included the inoculation of two rabbits and six guinea pigs to confirm the diagnosis.¹²⁶ Pasteur's inoculation test remained a fairly standard procedure of confirming diagnosis of rabies for less than twenty years. In 1903 an Italian scientist named Negri discovered what he thought was the causative organism for this

¹²⁴ Rush Shippen Huidekoper, "Rabies," Journal of Comparative Medicine and Surgery 10 (1889): 57; Dr. Harold C. Ernst, "An Experimental Research upon Rabies," American Veterinary Review 11 (1887): 230-31; A.B. Kelly, "Rabies, With A Report of Two Recent Outbreaks", Journal of Comparative Medicine Veterinary Archives 19 (1898): 741.

¹²⁵ M. Stalker, "Outbreak of Rabies in Iowa," American Veterinary Review 12 (1888): 173; Frank S. Billings, "Rabies in Cattle," American Veterinary Review 10 (1887): 506; R. H. Harrison, "Reports of Cases: Some Cases in Cattle Practice," Journal of Comparative Medicine and Veterinary Archives 19 (1898): 163; William Eddy, "Rabies in Cattle," Journal of Comparative Medicine and Veterinary Archives 20 (1899): 790.

¹²⁶ Anonymous, "Bitten by A Mad Horse," American Veterinary Review 11 (1888): 476; B.M. Underhill, "Case of Equine Rabies," Journal of Comparative Medicine and Veterinary Archives 17 (1896): 214-5; E.M. Ranck, "Report of A Case of Rabies, Including Experiments on Rabbits," Journal of Comparative Medicine and Veterinary Archives 20 (1899): 510-11.

disease, a protozoa found within the nerve cells of rabid animals. While he was incorrect in assuming that it was a protozoa the fact that he had discovered an inclusion body that appeared constantly in the neural tissue of rabid animals provided the veterinary profession with a quicker, easier and more humane method of diagnosing rabies.¹²⁷

If Pasteur's work provided a definitive test and an effective means of treatment it also led to more efficient standards of control, especially in Great Britain. In the summer of 1887 the House of Lords convened a select committee on rabies. From these meetings certain measures were strongly suggested: quarantines on foreign dogs, licensing and occasional muzzling of domestic dogs and the continued control of the stray dog population. By 1902 these measures allowed Britain to declare itself 'rabies free' and except for an outbreak in 1922, caused by smuggled animals, it has remained so ever since.¹²⁸

The one measure considered and rejected was vaccination, in part because of the inability of enforcement. There was also a concern as to the quality of the early vaccines. In the United States it was this latter issue, more than any other, which kept rabies vaccination on the back shelf until the 1920s. At the time the Japanese were developing a fairly effective vaccine for rabies.¹²⁹ By 1922 it was introduced into the United States.¹³⁰ On December 24, 1923 Los Angeles County California ordered every dog within that jurisdiction vaccinated for rabies. This was in response to a particularly bad outbreak of rabies in 1923 that had resulted in at least nine human deaths.¹³¹ Despite this order vaccination for rabies in dogs and cats did not become universally accepted until the 1940s.

The business of rabies control was largely left to the public health services and they were less than impressed with vaccination as a way of dealing with this disease. One preventive medicine textbook from 1935 noted that immunization of dogs was expensive and

¹²⁷ V.A.Moore and C.Way, "A Rapid Method for The Diagnosis of Rabies," American Veterinary Review 28 (1904): 658-662; C.Way, "The Negri Bodies and The Diagnosis of Rabies," American Veterinary Review 29 (1905): 937-42.

¹²⁸ Ritvo, 193.

¹²⁹ S. Umeno and Y. Doi, "A Study of The Anti-Rabic Inoculation of Dogs and The Results of Its Practical Application," Kitasato Archives of Experimental Medicine IV (1921): 89.

¹³⁰ A. Eichorn and B.M. Lyon, "Prophylactic Vaccination of Dogs Against Rabies," Journal of The American Veterinary Medical Association LXI (1922): 38-42.

¹³¹ T. H. Edwards, "Los Angeles County, California, Adopts Anti-Rabies Vaccination Ordinance" Journal of the American Veterinary Medical Association 63 (1923): 83-84.

disappointing. This work further stated that vaccination, no matter how effective, could not by itself control rabies for it did not reach stray dogs. Licensing, quarantine, impounding and destruction of stray dogs were far better controls.¹³² Obviously the public health concern was more towards controlling the disease than protecting the individual dog. This was where the veterinary profession came in. But, starting in the 1920s, the American veterinary profession concentrated mainly with livestock and did not consider companion animals worthy of much consideration. After World War II small animals began to play a more important part in American veterinary medicine and with this came renewed interest in rabies vaccination. At present vaccination is considered the most effective means of rabies control in The United States and Canada. Unlike Great Britain, rabies in North America is largely seen among wildlife such foxes, coyotes, skunks and raccoons, and vaccination provides a barrier against the disease getting into the domestic carnivores.¹³³

In England no such infected wildlife exists so quarantine is still seen as the most effective means of control.¹³⁴ Recently concerns have been raised about the 'Chunnel'--the tunnel that runs under the English Channel from Dover to Calais--allowing mad French dogs and foxes into England¹³⁵. This concern, plus the closer ties to the European Economic Community, has in recent years forced England to reconsider vaccination as a possible means of control.¹³⁶

¹³² Milton J. Rosenau, Preventive Medicine and Hygiene, 6th ed. (New York: D. Appleton-Century Co., 1935), 280.

¹³³ Center for Disease Control, "Rabies in The United States in 1976," in Veterinary Public Health Notes, (Washington D.C.: Department of Health, Education and Welfare, August, 1977); Center for Disease Control, Rabies, Annual Summary 1977 Washington D.C.: Department of Health, Education and Welfare, September 1978).

¹³⁴ Rabies Prevention and Control (London: Ministry of Agriculture, Fisheries and Food, 1994); Rabies, Guidance Notes for Practising Veterinary Surgeons (London: Ministry of Agriculture, Fisheries and Food, 1994).

¹³⁵ London Times (London) 19 February 1990; London Times (London) 7 March 1990.

¹³⁶ London Times (London) 5 February 1992; London Times (London) 8 February 1992; London Times (London) 16 June 1992.

CHAPTER 10: CONCLUSION

Any careful examination of the beliefs about, and treatment of, rabies, or hydrophobia, in eighteenth-century England and English North America will end up providing a series of multifaceted conclusions.

The examination of rabies first indicates that the main problem was one of diagnosis. With only symptoms to go on the diagnosis of rabies was often less than accurate. A number of other diseases, from tetanus to canine distemper, were often mistaken for this affliction. Yet for all the hit-and-miss diagnosis attempts were being made to make improve the knowledge of this disease. Autopsies of many of those who died of rabies were performed. Because of the general lack of gross pathological signs the results were generally inconclusive. Additionally, there appear in the medical literature numerous descriptions of clinical cases of this disease-- these descriptions are so numerous, in fact, as to a sort of medical overkill. Nevertheless, the combination of large numbers of clinical cases and the attempted correlation of symptoms with pathological signs did lead to, relatively speaking, a more accurate diagnosis of this disease.

These changes also led to a change in the therapeutics of rabies over time. Initially it was believed rabies was highly treatable. This led to a plethora of early eighteenth-century wonder drugs for both man and beast. Later, as diagnostic techniques improved and as more clinical data became available the methods of treatment changed. It was now recognized by the medical establishment that once the symptoms appeared the disease was generally untreatable. Thus, by the late eighteenth century the general therapeutics for rabies was an aggressive treatment of the bite wound and, if and when the symptoms appeared, large doses of opiates as a palliative treatment.

Since rabies affected not only humans but also animals, an examination of this disease also gives a fairly good overview of veterinary therapeutics. First, it is very clear that much less was done in the way of therapeutics for animals than for humans. The evidence seems to suggest that this was because animals, unlike their human counterparts, did not suffer from hysterical rabies, a condition which readily responds to all forms of therapy. While there is a definite correlation between hysterical rabies and therapeutics, how close that correlation is is impossible to determine.

On the other hand, many animals, especially dogs, were treated for diseases that were often mistaken for rabies. This appears particularly true for canine distemper. There were also more than a few instances of creatures being given medicines designed to prevent the symptoms of rabies from appearing. Lastly, there were a few cases where animals were aggressively treated for rabies, even though the symptoms had already appeared. The combination of all the cases reveals some interesting details as to eighteenth-century veterinary therapeutics. First, type of treatment did not seem to depend on the species of animal involved--pigs were just as likely to receive heroic medical measures as dogs. Secondly, in most cases the therapeutics for the animal, whether it was a cow or a dog, was both extensive and involved. Lastly, many of the medicines used to treat humans for rabies were also used to treat animals. In fact, more than a few so-called 'wonder' drugs of the early eighteenth century were actually medicines designed originally for animals. For example, certain drugs designed to combat rabies 'outbreaks' among kennels of hounds proved very successful in large part because there was no rabies to begin with, just a dispute over territory or mates between certain males. Thus, these medications developed infallible reputations with respect to their canine patients. When they were applied to humans their success rate fell dramatically, suggesting, if nothing else that individual human males had fewer disagreements over territory and mates.

No examination of rabies in this period would be complete without an evaluation of the attempts at prevention and control. It is very obvious from the historical literature that controlling this disease was far more complicated than one can imagine. Far from the average municipality ordering every dog killed during a rabies outbreak, the process of public prevention took on a more measured approach, an approach that was directly linked to the legal and social status of the animals in England and North America. In England animal control had a sort of class bias. Municipal authorities generally went after the numerous strays and avoided the animals owned by the middle and upper classes. This may have been because the upper classes were not above taking legal action against individuals who maimed or killed their pets. The historical evidence indicates such actions could be very expensive for the defendant. One reflection of dog killing leading to possible legal repercussions were statements in orders issued by municipalities excusing those individuals who killed these animals from any legal culpability. Another was limiting the killing process to employees of the municipalities, such as constables and beadle, thus assuring a more measured, less overzealous response.

A more humane approach to animal control were taxes on dogs. In England, much as with dog killing, the taxes took on a class attitude. Many who advocated such taxes claimed they

would make owning a dog too expensive for the poor who, it was held, did not have the intellectual or moral ability to care for such creatures.

In North America the taxes were far more egalitarian. The little evidence available from North America suggests they were passed with little or no problem. How long these taxes lasted is difficult to determine; what is evident is that by the middle of the nineteenth century they were standard fare for nearly every municipality in New England. In England these taxes proved anything but successful. Designed to punish the poor for keeping dogs, they instead unduely burdened the upper classes with immense taxes-sometimes as much as £20 or more a year. Because of this it came as no surprise that they were repealed within a year of being passed.

For all the failures and inconsistencies associated with rabies in this period, one factor becomes very evident. It was in the eighteenth century that the first attempts are made to study this disease in a methodical manner. In particular, the immense collection of clinical data when combined with the numerous descriptions of post-mortem evidence set the foundation for study of the disease in the nineteenth century. One particular aspect that provided a preview for future research were the early attempts at artifical production of this disease in experimental animals via inoculation. Almost without exception all attempts at this procedure ended in failure. But the fact that they were attempted again and again suggests the individuals who performed them saw in these procedures great potential for expanding the knowledge, and even possible control, of rabies. In the long run these individuals were to be vindicated.

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