Etiology of the Dancing Plague

The phenomenon of dancing mania (also Dancing Plague or choreomania) has manifested itself in various forms in cultures throughout the world since its first recorded emergence at the beginning of the Middle Ages. The Dancing Plague has often piqued the curiosity of scientists and scholars who believe that some variation of this phenomenon has played a role in many events of mythological, historical, and literary significance, including the Legend of the Pied Piper, the Salem Witch Trials, Tarantism in Italy, and the French Revolution. Scientists have posed several hypotheses for the direct cause of dancing mania, such as demonic possession, epilepsy, a spider bite, ergot poisoning, various cultural dimensions, and murine typhus epidemics [Donaldson, 1997 and Woolf, 2000]. Conversely, many scholars attribute the phenomenon to no single cause; rather, they believe that the choreas observed during the Middle Ages stemmed from the psychological impact of a barrage of natural calamities –plagues, war, and famine- that people faced during this time. Accordingly, the hardships endured by these people drove them to a frenzied state of mind and body of epidemic proportions. In this paper I will first outline the phylogenic relationships between the many known forms of choreas or dancing diseases. Then I will examine putative causal mechanisms of a defined version of dancing mania and explore how these proposed causes manifested themselves in some of the aforementioned historical contexts. Finally, I will discuss how dancing mania potentially exists today through the Snake Handlers of Appalachia.

The phylogenic tree of dancing mania has its roots in Western Europe, particularly in Germany and Luxembourg, where St. John's chorea, also know as St.

Vitus' chorea (chorea St. Vitii); Danse de St. Guy; or the Dancing Procession of Echternach, first originated during the Middle Ages. Medieval forms of dancing mania are separate from the truly pathogenic forms later identified in that they generally consisted of outbreaks of mass hysteria primarily based in religious fervor, pagan traditions, and superstition [Krack, 1999]. Many of these early manifestations focused around an annual dance procession on Whit Tuesday (the first Tuesday of Pentecost), which took place in the town of Echternach, Luxembourg in honor of St. Willibrord (658-739AD), the patron saint of people with moving disorders. Though historians have reported celebratory dancing in front of St. Willibrord's grave as early as 1100AD, the supposed miraculous healings of paralytics and a person suffering from tremors while near his sarcophagus in the late 1700s aroused a religious zeal and annual pilgrimage to Echternach that continues today. In the folk dance that evolved out of this tradition, four people stand side-by-side in a procession and hop three steps forward followed by two steps back until they reach St. Willibrorg's gravesite. At this point a form of mass cataleptic hysteria usually ensues [Krack, 1999].

Figure 1. Two women taking part in the Dancing Procession of Echternach,

painted by Georges Lenôtre 1885 (Paris, Archives Nationales).

A permutation of the proposed origin of the Dancing Procession of Echternach, is a legend in which a civilian, named Vitus, instigated a dancing epidemic through his fiddle playing. Apparently, St. Willibrord freed the people of Echternach from Vitus' spell. As a result, people honor St. Willibrord through the annual Dance Procession, which supposedly serves an additional function of protecting participants from developing moving disorders in the future. Though the Legend of Vitus was written in 1859, previous variations are thought to have dated back to the early Middle Ages [Krack, 1997].

Researchers of the Medieval forms of choreomania conclude that despite their strong component of socially instigated mass hysteria, one cannot discount the physiological impact that singing, dancing, and laughing might have on the neuroendocrinological system of those participating, through the release of hormones triggered by significant variations in their external stimuli. Moreover, fervent religiosity and strong faith have been documented to provoke such epidemics across cultures throughout history with characteristic spontaneity and infectiousness, regardless of the affected group's religious convictions [Krack, 1999 and Meige, 1904].

With the advent of modern medicine, St. Vitus' dance soon became synonymous with a true pathological condition with recognizable, bona fide symptoms, known as chorea minor or Sydenham's chorea (first identified in by Thomas Sydenham). This autoimmune disorder, typically observed in children ages 5-15 or in pregnant women (chorea gravidarum), results from neurological deterioration via the production of antineuronal antibodies. Scientists believe that this autoimmune response is mediated through a molecular-mimicry mechanism triggered by a previous infection with

rheumatic (scarlet) fever or a hemolytic strain of streptococcus [Schechter, 1975 and Goldenburg, 1992]. As a result, affected people usually exhibit a variety of tics and muscle spasms, uncontrolled smirking, an irregular gait, obsessive-compulsive disorder, and age-regressed behaviors [Swedo, 1993]. Another similar, though pathologically unrelated condition is Huntington's disease (chorea), discovered in the latter half of the nineteenth century by the American physician, George Sumner Huntington. Though often confused with Sydenham's chorea, Huntington's chorea only affects adults, usually past the age of forty –though onset of the disorder is non-determinate. This autosomal dominant genetic disease results in neurological degeneration. The famed folk singer, Woody Guthrie tragically died from this condition, whose primary symptoms are uncontrollable muscle spasm, dementia, and ultimately death. In contrast to the typically isolated, chronic cases of pathological choreas, dancing mania or chorea major acutely affects groups of people, implying it has a contagious quality that the other variations lack.

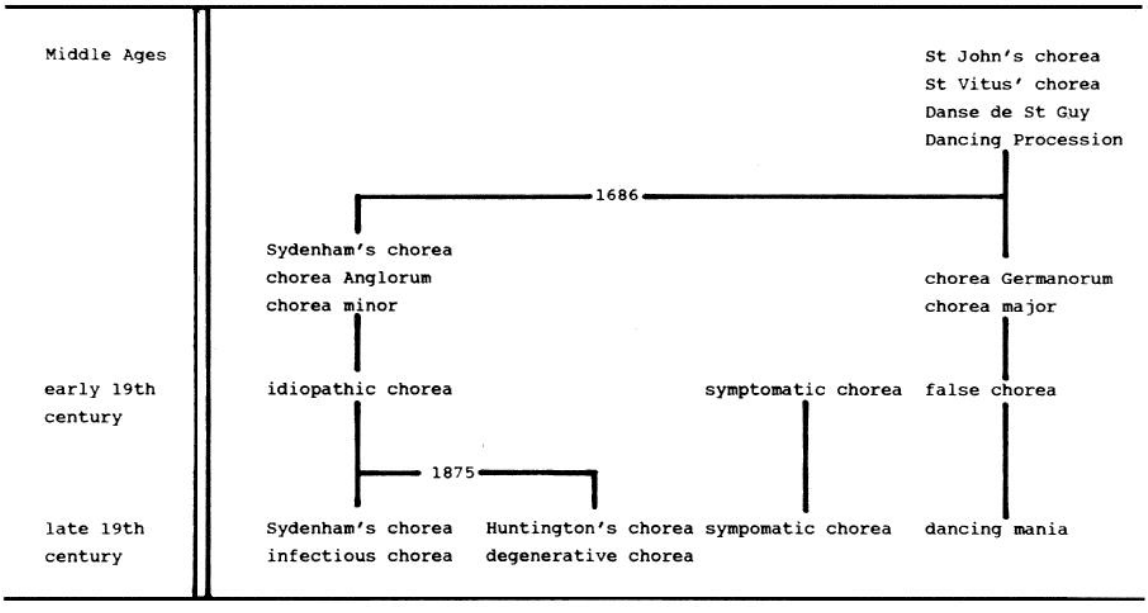

Figure 2. The phylogenic tree of dancing mania. [Lewis-Jonsson, 1949].

Because choreomania has a myriad of variant manifestations, one must first establish a pathological definition for the phenomenon in order to analyze its potential causes from an epidemiological standpoint. The following clinical definition for dancing mania, proposed in the mid-1800s, was based on the interpretations of J. Hecker's research into the phenomenon and A. Davidson's direct observations of an epidemic of dancing mania in Madagascar.

> *Choreomania may be defined as a psycho-physical disease, in which the will, intellectual faculties, and moral feelings are more or less perverted, with an irresistible impulse to motion, and an insane love of music, often sporadic, but with tendency in certain circumstance to become epidemic* [Davidson, 1867].

Within this defined realm of choreomania, L. Donaldson has summarized some potential biological, psychological, and social substrates for dancing mania that have been postulated.

The first suggested cause of the dancing epidemics, forwarded by the Roman Catholic Church, was demonic possession, thought to have occurred through bogus baptisms performed by morally corrupt priests. The only known cure for this condition was to receive a true baptism from a morally sound clergyman [Donaldson, 1997]. Other accounts stem from the actions of the Church in 1227, which placed a ban on secular dance in and around churches and graveyards, particularly targeting the pagan cultures that engaged in the Dancing Procession of Echternach. Accordingly, God would curse disobedient pagans with dancing disease as punishment for them disturbing a Christian mass and for their bold defiance of the Catholic Church [Krack, 1999]. Such stories are corroborated with known cultural dynamics among the peasants of this time and region. Prior to the presence of the Catholic Church, many of the peasants engaged in ancient orgiastic rituals drawn from the cult of Dionysus. However, with the infiltration of the

Catholic Church into their culture, many of the pagan rites practiced either assimilated into Christian traditions or were deemed morally unacceptable by the Church, thereby labeling such experiences as unnatural manifestations of sickness [Donaldson, 1997]. Thus, the Catholic Church may have single-handedly created a pathological condition through a prescribed adjustment of existing cultural dimensions in Western Europe. Alternatively, the peasants of the Middle Ages may have masked their natural human tendency to dance in the guise of a sickness to garner sympathy rather than condemnation from the Church. Accordingly, the Dancing Plague may have been a product of the people's austere outlook on peasantry life during this time operating within the constraints of the Catholic Church, as a necessary form of emotional catharsis.

A possible biological condition associated with dancing mania- not as a cause, per se, but certainly as a potential participatory factor- is epilepsy. The whole gamut of conditions involving tics, tremors, and muscle spasms, fall under the domain of neuromuscular disorders, including epilepsy. Persons afflicted with St. Vitus' dance, for example, were known to exhibit peripheral symptoms very similar to those found in epileptics, such as jerking limbs upon fainting, unconsciousness, snorting, and frothing at the mouth [Donaldson, 1997]. However, one's ability to feign such symptoms or initiate them psychosomatically, independent of any true neurological condition, draws such evidence into question. Furthermore, the characteristic symptoms of epilepsy have been well documented by modern medicine, and dancing is not among them. Thus, one must conclude that such neurological disorders are an unlikely independent cause of dancing mania, though their potential as instigators of such a phenomenon should not be discounted.

One of the more intriguing theories of dancing mania is Tarantism, a convulsive state thought to result from the bite of a tarantula. The Tarantella is a folk dance, which evolved out of the myth that performing such a dance either resulted from or would protect one from the effects of spider venom. Interestingly, the historical context in which this myth first emerged was in the Apulian region of Italy during the fifteenth through seventeenth centuries, a time period in which extensive deforestation enabled large spiders to thrive in an increasingly arid climate. For this reason, the people indigenous to this region were probably more inclined to attribute Tarantism to spider bites. Furthermore, had people been bitten, the increased temperature of this climate could have activated certain toxins that would have otherwise been harmless. Despite these findings, experiments have since found that supposed episodes of Tarantism were not necessarily associated with a spider bite, nor could one induce symptoms of Tarantism clinically with spider venom. Thus, this rumor was put to rest, at least within the realm of science, though it perpetually exists through legend and a famous folk dance, the Tarantella [Donaldson, 1997].

Scholars have forwarded two more potential biological substrates for dancing mania: typhus fever and ergot poisoning. Typhus fever and its sister forms: the Black Plague and Rocky Mountain spotted fever, generally use an insect vector such as a flea or tick as their primary means of transmission. The squalor and close quarters in which majority of the people lived during the Middle Ages made a perfect environment for such infectious diseases to thrive in epidemic proportions. Because so many people were infected by some from of plague during this time and many of these diseases had tremors

or uncontrollable movements as an associated symptom, this point in history was ripe for the emergence of the dancing plague [Dirckx, 1980].

Ergot is a species of fungus, *Claviceps purpurea*, which wreaks havoc on animals (including humans) that consume it through its release of a potent mycotoxin, an alkaloid (lysergic acid derivative) that is an active ingredient in the hallucinogenic drug, LSD. Ergot grows on a wide variety of grains, including corn, wheat, rice, barley, oats, and in particular, rye. Ideal growing conditions for the fungus are a cold winter with a wet and cloudy spring and high humidity. Characteristic symptoms of those suffering from ergotism include painful muscular contractions, vertigo, mania, delirium and both visual and auditory hallucinations, all of which parallel those symptoms observed in many of the choreas [Donaldson, 1997 and Woolf, 2000]. Therefore, it is quite possible that many of the reported instances of dancing mania throughout the world are linked to the toxins produced by this fungus.

Throughout history, plagues of all varieties have raged throughout Europe. Moreover, farming conditions have often been favorable for the growth of ergot, which may have been unknowingly incorporated into people's rye bread and other cereals. Many potentially correlative cases of dancing mania in history have been linked to such occurrences which have been elucidate only recently through inference and a constellation of epidemiological and agricultural data, compiled from varied sources. Following are two such examples.

One of the most interesting legends to have originated during the Middle Ages, which incorporates some possible elements reminiscent of dancing mania, is that of the Pied Piper of Hammelin. This tragic tale tells the story of a town, Hammel, in the Saxon

region of Germany that had become infested by rats. The townspeople soon appealed to their king to get rid of the vermin. Otherwise, they threatened to dethrone him. The king searched for an answer to no avail, until a mysterious piper, dressed in a piebald outfit of yellow and red, arrived at his court and offered to rid the town of the rats.

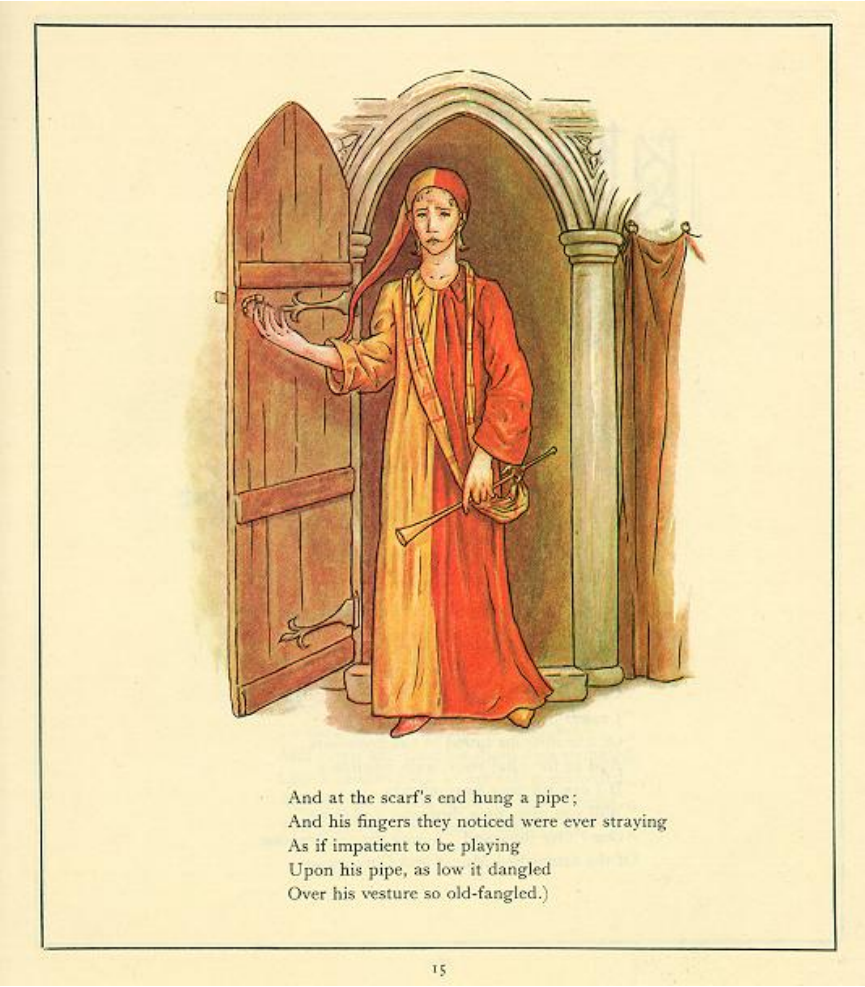

Figure 3. Browning, Robert. *The Pied Piper of Hamelin*. London: Frederick Warne, 1888. Illustrated by Kate Greenaway.

After the king agreed to pay the man an exorbitant sum for his services, the piper led the animals away to their ultimate demise with the sweet melody of his pipe. The townspeople cheered as the vermin drowned in the near by river, knowing that whether or not the piper was paid for his efforts, the rats would not return. The story reaches its

climax in the following excerpt from Robert Browning's book, published in 1888. At this point the King has just denied the Pied Piper his payment of service. Thus, the Piper invokes his wrath on the children of Hammel, leading them merrily away to an undetermined fate.

Once more he stept into the street,
And to his lips again
Laid his long pipe of smooth straight cane;
And ere he blew three notes (such sweet
Soft notes as yet musician's cunning
Never gave the enraptured air)
There was a rustling that seemed like a bustling
Of merry crowds justling at pitching and hustling,
Small feet were pattering, wooden shoes clattering,
Little hands clapping and little tongues chattering,
And, like fowls in a farm-yard when barley is scattering,
Out came the children running.
All the little boys and girls,
With rosy cheeks and flaxen curls,
And sparkling eyes and teeth like pearls,
Tripping and skipping, ran merrily after
The wonderful music with shouting and laughter.

Depending on the version read, accounts of the ultimate fate of the children vary from them never being seen or heard from again, to them drowning (like the rats) in the adjacent river, to them being brutally massacred, with their dismembered bodies strewn throughout the trees and underbrush of the near by forest [Manchester, 1993]. What does remain consistent across the many versions of this legend is that children followed the Pied Piper willingly, dancing merrily along after him. Who was this mysterious piper? Was this piebald caricature depicted in legend a metaphor for some other force that acted on the children or was he an actual person?

Conflicts surrounding the origins of both the Legend of the Pied Piper of Hammelin and the tale's central figure abound. The Pied Piper of Hamelin was, in fact, a real person; though he was not the romanticized character that mythmakers of the Middle Ages made him out to be. On the contrary, he was described as a psychotic pedophile who somehow simultaneously kidnapped 130 children [Manchester, 1993]. Though such a person may have lived during this time, the probability of him whisking away 130 children, literally from under the townspeople's noses, seems highly unlikely, if not impossible. Thus, a more plausible explanation for the children's disappearance is required.

A possible explanation for the behavior of the children in this legend, aside from them being kidnapped, is that they were afflicted with an outbreak of murine typhus (also typhus fever). Two key factors that point to this conclusion are the legend's association with rats, suggesting the presence of a rodent-borne disease, and the reference to the piebald (red and yellow) coat of the piper, reminiscent in its pattern to the puss-filled lesions and rash associated with both the Black Plague and typhus fever. Both of these illnesses are transmitted by the bite of a flea infected with rickettsia, a pathogenic family of bacteria whose diseases leave victims shivering with chills and covered with sores and spotted lesions. Accordingly, scientists believe that the legendary 130 children who metaphorically disappeared at the hands of the Pied Piper, in reality suffered from a typhus fever epidemic due to the rat-infested conditions in which they lived. This theory would explain why the children all subsequently died around the same time and were supposedly buried in a common grave. Other symptoms associated with typhus fever, including chills and muscle spasms evoke images of dancing mania, later incorporated

into the tale [Dirckx, 1980]. Thus, the plague-like conditions depicted in this legend suggest a pretext for dancing mania, which has been documented to have occurred throughout Western Europe during this time.

Another point of inquiry regarding this legend is when it supposedly took place. Much discrepancy exists over this question. For example, Robert Browning places the date of the children's disappearance as being July 22, 1376; whereas an original stained glass window commemorating the children's disappearance under the piper's influence was mounted in the market church of Hammel in the year 1300. According to William Manchester, author of *A World Lit Only by Fire*, the event occurred on June 20, 1484. What is most curious about these dates is not only how they are decades or centuries apart, but also how they are remarkably specific as to the exact month and day. All of this inconsistency suggests that the legend of the Pied Piper of Hammelin is merely a conglomeration of historical events that occurred in this area throughout the Middle Ages. Accordingly, dancing mania could have easily become intertwined with the many contributing components of folklore and history that comprise this legend.

Centuries later, another potential cause of dancing mania emerged in America, among the colonies of New England. In the spring of 1692, eight young girls in the Puritan community of Salem, Massachusetts, began to exhibit a series of bizarre physical and psychological symptoms. They writhed in pain and endured bouts of convulsive twitching. Most importantly, they became mentally unsound and delusional, accusing fellow townsfolk of causing their ailments through witchcraft. Such claims erupted into a firestorm of subsequent accusations, convictions, and executions known as the Salem Witch Trials. By the time the witch hunt finally subsided, more than 150 Puritans were

imprisoned and twenty had been put to death for their supposed practice of witchcraft, all of whom vehemently proclaimed their innocence. At this time, one diagnosed with bewitchment was to show the following clinical symptoms: fainting, visual delusions, animal imitation, odd contortions and gestures, simulated flying or diving, convulsive fits, and delirium [Woolf A, 2000]. Moreover, they supposedly exhibited sensations of their tormentors directly pinching, pricking, and burning their skin. Analyses of agricultural records during this time in Salem indicate that conditions were perfect for ergot growth. Additionally, a crop failure was thought to have possibly occurred in the Massachusetts Bay Colony during this time, forcing people to turn to rye as their primary source of grain. Rye is one of the most susceptible grains to ergot infestation. Also at this same time, a number of livestock were said to have died of complications associated with ergot poisoning [Donaldson, 1997 and Woolf, 2000]. Thus, it is highly probable that the symptoms attributed to bewitchment in the first girls affected, were probably initially due to ergotism. However, once the girls started to make accusations, they became unable to retract their claims, lest they be accused of witchcraft themselves. Perhaps the hysteria that ensued is what enabled the girls' accusations to spiral so far out of control, resulting in an aftermath of horrific consequences. Though mass social hysteria could have helped to instigate the Witch Trials, it is unlikely that such vacuous claims alone would have been able to convict so many people. Thus, mass hysteria, born from an insular, theology-driven society, probably worked in conjunction with an ergotism-catalyst to sustain a regular, long lasting string of witchcraft accusations.

Of the previously mentioned possible causes of dancing mania throughout history, none is able to account for the true cause of numerous accounts of the Dancing Plague

observed during the Middle Ages, in which people simply danced away to their death en masse. All of the possible causes listed may have served some role in these events; however, there seems to remain some essentialistic quality to this condition that has yet to be deciphered. Perhaps, the reason behind why the central cause of dancing mania is so elusive is that it ultimately resides in the metaphysical, as some undeniably human need to dance that, in part, defines who we are. Why does dancing always seem to have a contagious aspect to it? Why do we hardly ever see a social situation in which just one person is dancing? Whether in a dance club or at a concert, people today simply dance as a means of expression or emotional release from the stresses and sorrows incurred through everyday life. The fact that human beings today and of centuries past have all experienced emotional stress that needs to be purged, suggests a causative link between current forms of dancing mania and what may have driven people to dance during the Middle Ages.

A possible contemporary analog of this catatonic dance phenomena from cultures and centuries past is the physically and psychologically charged modes of worship seen in Pentecostal churches throughout the United States today. An extreme example of this type of worship exists in the Church of Jesus With Signs Following in Scottsboro, Alabama, having garnered much media attention over the past decade for its members' sensationalized snake handling practices used during worship services. The religious practices of this church are rooted a literal interpretation of Biblical scripture out of the Gospel of Mark and the book of Acts. Specifically, their doctrine centers on the following passage:

> *And these signs shall follow them that believe; In my name shall they cast out devils; they shall speak with new tongues; they shall take up serpents; and if they drink any deadly thing it shall not hurt them; they shall lay hands on the sick, and they shall recover! [Mark 16: 17-18].*

Concomitant with their trust in the direct exegesis of the above passage, these people believe that the Holy Spirit descends upon a faithful individual, imparting them with said abilities (the signs). Church members believe the Holy Spirit is the force that drives them into their cataleptic frenzy, a state of true receptiveness of God's powers. This uninhibited and spasmodic state of body and mind is strikingly reminiscent of the Medieval dancing choreas or the climactic conclusion of the Dancing Procession of Echternach today. Another interesting point of convergence is that both cultures exhibit these phenomena in association with Pentecost. In the Catholic and Protestant sects of Christianity, the season of Pentecost, which recognizes the early beginnings of the Church after Jesus' crucifixion, is reflective of events occurring in the Biblical book of Acts. The primary difference is that the Dancing Procession of Echternach takes place once a year on Whit Tuesday, whereas the members of the Church of Jesus With Signs Following engage in such practices on a continual basis. The following excerpt from Dennis Covington's book, *Salvation on Sand Mountain*, vividly depicts scenes from the snake handler's fascinating worship services:

> *I was sweating and expectant, lifted on the general surge. I could tell something was about to break loose, but I couldn't predict its shape or form… [T]hings started getting a little wild. Lydia Hollins was singing in a voice as raw and tortured as Janis Joplin's when flamboyant Brother Timmy, suddenly seized by the rhythm of the music, started dancing down the isle towards the front, his tambourine going….He danced in front of the platform, stomping his feet and tossing his head….[Gracie McAllister], a woman in a simple pink jersey and flower-print skirt…seemed like the least likely person in the world to pick up a rattlesnake, but in the midst of her dancing, she suddenly veered toward one of the serpent boxes. Unclasping its lid, she took out a two-and-a-half-foot-long canebrake rattlesnake and held it up with both hands. Then she turned a slow circle with the snake outstretched…. By the time Gracie had passed the snake to her husband, Ray, a half dozen more faithful had joined them and had begun lifting snakes from the other boxes in no apparent order and with no apparent plan. They were shouting praise and praying out loud. Some were speaking in tongues…. Donna…was laboring in the spirit with a cataleptic friend. She circled the friend, eyeing her contortions carefully, and then, as if fitting her into an imaginary dress, she clothed her in the spirit with her hands, an invisible tuck here, an invisible pin there, making sure the spirit draped well over her flailing arms. It took her a while. Both women were drenched in sweat and*

stuttering in tongues by the time they finished…lips loosened, tongues flapping, eyes rolling back in the head.

Further accounts of such services describe the contagious quality of the atmosphere. For instance, the author was startled on several occasions to find himself, as an objective observer, uncontrollably rattling his tambourine, as if his arm were a separate from his body and dominated through the energy exuded by these people. Those persons afflicted, or in this case blessed, by this sublime manifestation of dancing mania, attribute it exclusively to something divine and transcendent to everyday life that is fundamental to their Christian beliefs, i.e. the presence of the Holy Spirit. This belief parallels descriptions of past forms of dancing mania, which have also been described, independent of the group's ethos, as being rooted in sincere faith and religious fervor.

In conclusion, the qualities ascribed to forms of dancing mania throughout this paper, including intense religiosity and mass hysteria, seem to embody the true essence of this phenomena that has ultimately eluded us. What is certain is that whenever human beings experience such social factors in conjunction with their human need to dance, dancing mania in any of its various manifestations is possible. Thus, dancing mania is perhaps a hyperbolic reflection of our human nature, influenced by external factors and mediated through social interactions.

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