The Other Lister: Martin Lister, a seventeenth century "Spider Man" and Royal Physician

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I. Introduction

The spider has remained structurally unaltered in 250 million years, its multiplicity of eyes, two poison fangs, and eight legs a constant. The usual reaction to these little creatures is fear of its webs, revulsion at its eating habits, worry at its spindly legs. Early modern Italians thought that the bite of a furry tarantula would cause the sufferer to dance a jumping jig incessantly and invented a new dance to imitate their movements--the tarantella. The Russian composer Mikhail Glinka’s version for the piano features incessant and fiendish staccato for the right hand and a lively downbeat for the left. New Mexicans fear being bitten by a brown recluse spider, its beautiful dark and violin-shaped coloring a warning against wounds that are deep, piercing, and slow to heal; my father still has the fanged scars on his back from rolling over onto one hiding in his bed. Seventy percent of women in the United States are arachnophobes, and the enormous size of the long-legged English house spider is a national cliché.¹

A few souls though have thought about spiders more benignly, their fear replaced by curiosity or wonder. Arachnids have been worshipped out of admiration, the Indians making the spider a symbol of liberty, ‘being the only creature that can raise itself up by its own bootstraps’.² Victor Hugo, out of generosity of soul, stated that he loved the spider and the nettle, ‘because they are hated’. Modern cartoonists have created a hero played in Hollywood films by heartthrob and vegetarian Toby Maguire, whose alter-ego can shoot spider-silk, climb buildings with grace, and swoop down his guide lines to save his dishy girlfriend Kirsten Dunst from dastardly villains. He even eats flies.

But this paper concerns another “spider man” entirely, not a thin and polite movie star, but a bewigged and frock-coated seventeenth-century physician and virtuoso who was passionately interested in the natural world

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² Ibid., p. 192.
and who was one of its very keenest observers. His name was Martin Lister, and among other things, he was the very first arachnologist. When most hear the name Lister in connection with the history of medicine, they automatically think of the surgeon Joseph Lister. This paper, however, will discuss the work of this other physician with the same surname who, though largely forgotten today, was an eminent practitioner in the seventeenth century. Keats wrote that ‘It appears to me that almost any man may like the spider spin from his own inwards his own airy citadel’. Like the spiders he studied, Martin Lister spun a citadel of unsurpassed scientific imagination. I will argue in particular that Lister's interests in natural history, particularly entomology, informed his medical theories of syphilis and smallpox in a manner unique to the literature. Lister’s research involved not only taxonomic classification of plants and animals, but also the subsequent reclassification of disease and drug types. These reclassifications included his consideration of the role of insect vectors in disease and new pharmaceuticals based on discoveries of materia medica in colonial outposts. Lister’s work thus resulted in a novel ontological understanding of the collective entities of medicine and natural history. After a short biography, I will discuss why this early virtuoso and physician of great importance to the early Royal Society has been neglected in scholarly studies, before turning to the specific interactions of his interests in natural history and the causation of disease.

II. Biography

Martin Lister was born into a distinguished medical family connected to high office and royalty. Two of his great-uncles, Edward and Matthew, were court physicians, so medicine was clearly in Martin’s blood. Martin was educated at St. John’s College, Cambridge (M.A. 1655), and then studied medicine at Montpellier from 1663-66. When on the continent, he became ‘an avid natural historian’ and physician, eventually becoming a court physician for Queen Anne in 1702. Elected a Royal Society Fellow in 1670-71, Lister devoted himself to a variety of biological studies, including botany, fossils and shellfish, forging a friendship and lengthy

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correspondence with John Ray (1628-1705) and ultimately contributing over 50 papers to the Philosophical Transactions. He was elected vice-president of the Royal Society from 1683-87, often chairing meetings when President Samuel Pepys was called away on business. While a fellow and officer, Lister sponsored Ray’s books on insects and birds, helping to identify species, and was on the committee to see Frances Willoughby’s (1635-72) and Ray’s Historia Piscium through to completion and supervised the completion of the engravings and printing. Lister also sponsored Edward Llwyd’s (1660-1709) research into fossils, designed the cabinets for the mineral collection at the Royal Society Repository. He invented the histogram and the stratigraphic geologic map. The limited amount of scholarly work about Lister has primarily analyzed his investigations in natural history and his role as the founder of conchology and arachnology. But little other attention has been paid to Lister’s life and his achievements, particularly in medicine.

Some of the reasons why Lister’s many contributions have been neglected may have been because of the way he was perceived in the

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6 For instance, Lister's De scarabaeis Britannicus was printed as part of Ray’s publication of Willughby’s Historia insectorum (London, A. and J. Churchill, 1710).
7 Lister’s invention of the histogram to do barometric readings is mentioned by his colleague Robert Plot, ‘Observations of the Wind, Weather, and Height of the Mercury in the Barometer, through out the year 1684; Taken in the Musaeum Ashmoleanum at Oxford, by Robert Plot, LL.D. to which is Prefixt a Letter from Him, to Dr. Martin Lister, F. of the R. S. concerning the Use of This and Such Like Historys of the Weather’, Phil. Trans., 15 (1685), 930-943; Lister’s barometric method is also in T. Birch, The History of the Royal Society of London [1660-1687]. (London, A. Millar, 1756-7). 4 vols, vol. 4, p. 222, as well as in the Boyle Papers at the Royal Society Library, vol. 41, fols. 149 and 150; C. Kostelnick and M. Hassett in Shaping Information: The Rhetoric of Visual Convention (Carbondale, Illinois, 2003), p. 237 also mention Lister’s histogram, attributing its previous origins as “unknown”. For Lister’s contributions to the mineral cabinets, see Birch, History of the Royal Society, vol. 4, p. 250; Flamsteed solicits Lister’s advice in Flamsteed to Lister, 8 July 1703, MS Lister 37, Bodleian, Oxford University, fol. 74r.
popular imagination in his own time. He had a well-known penchant for amassing cabinets of curious specimens, he published upon a diverse variety of non-scientific topics, and his work with insects and snails, which though pioneering, was perceived as trivial by the larger public. So vast was Lister’s collection of books, natural history specimens, and Roman altarpieces and coins, that when he donated them to Oxford University, they painted ‘over the door of the library… the following inscription in letters of gold—*Libri Impressi & Manuscript e donis Clariss. Virorum D. Elias Ashmole & Martini Lister*.’ There was also a specified ‘scribnerium Listerium’ in the early Ashmolean. His very public love of collecting and wide interests thus made him a choice target for satirists of virtuosi. William King (1683-1712) lampooned Lister’s best-selling travel memoirs of Paris as well as his annotated edition of the cookbook of Apicius (1705), especially with its references to contemporary English cuisine ‘Humbly inscrib’d to the Honourable Beef Steak Club’. Shadwell in his satirical play *The Virtuoso* performed in 1676 poked fun at Lister’s penchant for studying spiders and ants. A visitor to the laboratory of Sir Nicholas Gimcrack in *the Virtuoso* stated, ‘What does it concern a man to know the nature of an ant’, and another visitor replies, ‘Oh, it concerns a virtuoso, so it be knowledge, ‘tis no matter of what’.

These assessments, however, are quite misleading. Practising scientists continue to use Lister’s observations, and entomologists have

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9 C. Burman (ed.), *The lives of those eminent antiquaries Elias Ashmole ... and Mr William Lilly, written by themselves; containing first, William Lilly's History of his life and times, with notes, by Mr Ashmole: secondly, Lilly's life and death of Charles the First: and lastly The life of Elias Ashmole ... by way of a diary. With several occasional letters.* (London, T. Davies, 1774), p. 381.


recently recognised that Lister came close to a biological definition of arachnid species and discovered that it was ‘silk that dragged spiders into the atmosphere’. Lister wrote to the naturalist John Ray in 1668:

certainly if you had been with me in September I would have gladdened your heart with a delightful spectacle. You will remember that long spell of sunshine and fine weather then, such as you and I have so often enjoyed in the happy land of Narbonne in the south of France. I then, while collecting Spiders . . . wanted to examine more closely those marvelous strands fallen from the sky, and in those investigations chanced upon this Spider which I had never seen before… Suddenly the one I was watching left off what it was doing, and bending backwards it pointed its anus into the wind and shot forth a thread in exactly the way a lusty lad expels urine from his swollen bladder. I was surprised at the creature’s unusual behavior, then I saw the thread stretched for many ells and waving in the air; soon, however, the Spider herself jumped upon it and was swept away whither she was pulled by the thread which was still sticking firmly to her rear, and was borne over some quite tall trees.

Lister is given the credit for his discovery of spider ballooning in the literature, and entomologists are presently constructing mathematical models that show how turbulent air can propel these creatures much further than even Lister thought - up to hundreds of kilometers out to sea. As the entomologist Eric Duffey has indicated, the activity of ballooning is especially prevalent in the temperate regions of the Northern Hemisphere among a small species of the family Linyphiidae, as well as among juvenile spiders from larger species. Their best flight times apparently are on cloudy fall and summer days when there are a combination of cooler temperatures and superior updrafts. Lister had also noted that this behavior was season-dependent, and spiders ballooned to catch gnats and other prey. He wrote:

In Winter and at Christmas I have observed them busy a darting, but few of them saile then, and therefore but single thred only are to be seen; And besides, they are but the young ones of last Autumns hatch, that are then employed; and it is more than probably, that the great ropes of Autumn are made only by the great ones, and upon long passages and Summer weather when great numbers of prey may invite them to stay longer up.\[16\]

This spider behavior has recently been of note to farmers. As Dr. Andy Reynolds noted:

Each day of the growing season, around 1,800 spiders land in each hectare (about 2.5 acres) of arable farmland after ballooning [to eat gnats]. If the farmers can predict the influx of spiders, they can reduce the amount of pesticides accordingly.\[17\]

Though Lister’s subsequent paper to the Royal Society classifying English spiders only contained 37 species - he was obviously wrong that there were such a small number of arachnids in England - John R. Parker, former president of the British Arachnological Society, remarked of his work that ‘one can see the seeds of a modern system of classification [of fauna] eighty years before Linnaeus and his disciples’. Indeed, Linnaeus cited Lister’s spider observations extensively in his tenth edition of his Systemae Naturae.\[18\] We also see a high standard of scientific illustration in Lister’s work, part of a tradition of artistic excellence practiced among what are called the ‘York virtuosi’. Lister practiced in York for 13 years (1670-83). This particular spider piece was done by William Lodge, the son of a wealthy merchant in Leeds. When he lived in York, Lister was also friends with Francis Place, the inventor of the mezzotint, and Henry Gyles, the glass-painter. Later, Lister trained his two daughters in how to limn and engrave to produce his masterwork on molluscs, the Historia Conchyliorum, which was the standard work on the subject for 100 years and cited by

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\[16\] [Martin Lister], ‘Some Observations Concerning the Odd Turn of Some Shell-Snailes, and the Darting of Spiders, Made by an Ingenious Cantabrigian and by Way of Letter Communicated to Mr. J. Wray, who Transmitted Them to the Publisher for the R.S’. Phil. Trans., 4 (1669), 1011-1016 [at 1015]. Lister submitted this article anonymously.


\[18\] Parker, Martin Lister’s English Spiders (1678), p. 29.
Darwin. His daughters engraved over 1100 plates with one or more figures.

Not only did he pioneer elements of scientific illustration, conchology, and arachnology, but Lister’s proficiency in botany was honoured by having a new genus of orchid, Listera, named after him by the eminent Scottish botanist, Robert Brown, F.R.S. (1773-1858), the first keeper of botany at the British Museum, and there is a tetragnathid spider, Pachygnathia listeri that also carries his name. In 2007, entomologists realized that Lister’s observations on English Hemiptera (true bugs) were the first records of several species, as well as the first locality records for any British bug.

Lister’s reputation may also be on the rise as more recent scholarship in the history of science has been more inclusive and welcoming of studies of natural history and its practitioners. Zoology, botany, mineralogy and the other disciplines of res naturae are now perceived as not mere supplements to the work in physics and astronomy of ‘the scientific revolution’, but at its very core. Further, historian Harold Cook has noted the extent to which early modern physicians often were prominent natural historians, imbibing a commitment to ‘natural history as the best way of knowing’, and cited Lister as an example.

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23 H. J. Cook, ‘Physicians and natural history’, in N. Jardine, J. A. Secord and E.C. Spary (eds.), Cultures of Natural History (Cambridge, Cambridge University Press, 1996), pp. 91-105 [at 100-101]. In a short article, J.D. Woodley has also somewhat resuscitated Lister’s contributions to conchology with his studies of the contributions of Lister’s female family members in the creation of his masterwork, Historia conchyliorum (1685-1692). See J. D. Woodley, “Anne Lister, illustrator of Martin Lister’s Historiae Conchyliorum”.

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Lister was therefore not a dilettante observing for the sake of observation like Shadwell’s Nicholas Gimcrack, but his dedication to detailed empiricism was for an important purpose, as he stated in a letter to John Ray:

For my part, I think it absolutely necessary that an exact and minute distinction of things precede our learning by particular experiments, what different parts each body or thing may consist of; likewise concerning the best and most convenient ways of separation of those parts, and their virtues and force upon human bodies as to the uses of life; all these, besides the different textures, are things subsequent to natural history.\textsuperscript{24}

\textit{III. Entomology and Smallpox}

Lister’s keen empiricism extended to his medical studies which incorporated his interests in natural history and entomology. This was especially the case for his publication, the \textit{Sex Exercitationes Medicinales} (1694).\textsuperscript{25} Lister had commented in some private notes that:

\begin{quote}
I must yet for my owne part affirme that I am much beholden to the studdie of Insects for the disciplining my thoughts, & making of them readier in observing, if you will … usefull & necessarie things in Phisic.\textsuperscript{26}
\end{quote}

This guiding philosophy was also literally born out in one of his tracts in his \textit{Sex Exercitationes Medicinales}, the “Dissertation on Smallpox.” (His second edition also included essays on smallpox and the stone, in addition to the original six pieces about dropsy, diabetes, rabies, syphilis, scurvy and arthritis.) In the course of his examination of the etiology of smallpox, Lister used his knowledge of entomology to investigate the possible role of insect vectors when tracing the ultimate origins of the disease.

Until the mid-1800s, the pathogenesis of smallpox was generally thought to be a type of “putrid bubbling” or fermentation that occurred in the blood. The origins of this model come from the Islamic physician Rhazes in

\textsuperscript{24} Ray, \textit{The Correspondence of John Ray}, p. 49.
\textsuperscript{25} M. Lister, \textit{Sex exercitationes medicinales de quibusdam morbis chronicis} (London, S. Smith and B. Walford, 1694); a revised and enlarged edition was published as \textit{Octo exercitationes medicinales} (London, Samuel Smith and Benjamin Walford, 1697). I will be citing from the second edition in this article.
\textsuperscript{26} MS Lister 39, fol. 2. Bodleian Library, University of Oxford.
In the tenth century, a humoral physician who conceived of the disease as “an almost salutary childhood distemper which assisted in the inevitable transition from the moist blood of childhood to the mature, “drier” blood of adulthood.” Rhazes suggested that the excess moisture escaped the blood via the pustules of the disease, and he compared its course to the fermentation of wine:

Now the smallpox arises when the blood putrefies and ferments, so that superfluous vapors are thrown out of it and it is changed from the blood of infants, which is like must, into the blood of young men, which is like wine perfectly ripened . . and the smallpox itself may be compared to the fermentation . . which takes place in must at that time. 

Later physicians modified Rhazes’ ideas, and postulated that smallpox was caused by the fermentation of certain substances in the bloodstream such as residual menstrual blood or undigested food. The putrid matter would then cause the pustules of the pox. Lister’s colleague, Dr. Thomas Willis, used Rhazes’ ideas and applied his own conception of corpuscular and iatrochemical animal spirits to them. Willis agreed that:

This disposition or natural predisposition, which inclines humane kind to this Disease, seems to be a certain evil or impurity of the Blood, conceived in the Womb, among the first Rudiments of Generation; almost all Authors would have this ascribed to the Menstruous Blood.

Willis then claimed the seeds of the putrid menstrual matter hid amongst the animal spirits in the brain and spinal marrow, whereupon they spread to the bloodstream and worked their mischief when provoked by ‘the contagion

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29 T. Willis, Dr. Willis's practice of physick being the whole works of that renowned and famous physician wherein most of the diseases belonging to the body of man are treated of, with excellent methods and receipts for the cure of the same: fitted to the meanest capacity by an index for the explaining of all the hard and unusual words and terms of art derived from the Greek, Latine, or other languages for the benefit of the English reader : with forty copper plates. (London, T. Dring, C. Harper, and J. Leigh, 1684), p. 118.
received from some place: the disposition of the Air, and the immoderate perturbation of the Blood and Humors’.  

In his treatise on smallpox, Lister argued that such claims from this “much-praised scholar” were dubious. His criticism came from two sources. Part of his critique aimed to please the Censors, as the fashion in College was to display basic loyalty to Willis’s general approach, while disputing his ideas about fermentative agitations in the blood; Walter Charleton had used a similar strategy in his Three Anatomic Lectures (1683), as well as his Inquisitiones Medico-Physicae (1685) on the pathology and physiology of menstrual flux. Lister also showed he was au fait with the latest medical ideas by discounting Willis’s idea that animal spirits were supposed to travel through a narrow cavity or pores in the nerves; his own anatomical dissections showed that nerves were solid in nature. Besides, Lister pointed out that if the animal spirits contained the poison, why were smallpox victims not in pain along the spine? In his later De Humoribus (1703), Lister wrote: “There remains one other humour, the animal spirits, the subtlest of all; credited with an infinite number of properties . . . For solution of any difficult problem, they bring in this deus ex machina and take refuge in this animal spirits carried about by the nerves.” Though eminent Georgian physician George Cheyne was heralded by Roy Porter as “a modern” for making largely the same conclusion about the animal spirits in his The English Malady, Cheyne’s work was not published until thirty years later. Lister further argued that that menstrual fluids had “no corrupt matter in them naturally at all, but that they are harmless as men’s saliva, or the remaining bulk of the blood, from which they come.” If this were true, women would be more afflicted than men by smallpox, especially when menstrual periods were imminent “when the fluids swell and collect in the uterus.” As this was clearly not the case, the notion of a uterine poison transmitted by animals spirits was groundless, which meant there was another cause responsible.

30 Willis, Dr. Willis’s practice, p. 119.
32 Lister, Octo exercitationes medicinales, p. 268.
35 Ibid., p. 269.
36 Ibid., p. 269.
Lister also rejected Thomas Sydenham’s (1624-89) idea that miasmas from subterranean minerals contaminated the air and caused smallpox.\footnote{Ibid., p. 273.} Through systematic study of epidemic diseases, Sydenham noted that different years possessed different “constitutions” and speculated that different qualities of weather or air would produce specific diseases; Sydenham’s conclusions were a variant of Hippocrates’ ideas in *Airs, Waters, Places*. Lister, while sensitive to ideas of environment and health, however dismissed Sydenham’s idea of mineral exhalations as “unadulterated fantasy” created in “ignorance of natural history.”\footnote{Idem.} Lister after all had devoted years to studying the chymistry of pyrites in his investigation of healing springs, published in *De Fontibus*.\footnote{A.M. Roos, *The Salt of the Earth: Natural Philosophy, Chymistry, and Medicine in England, 1650-1750* (Leiden, Brill, 2007), pp. 65-80, passim.} Here, he had formulated the idea that these minerals could produce sulfureous vapors that would heat mineral springs and influence the weather, but in the course of his observations, he saw no evidence there was any relationship between mineral exhalations and disease. Admittedly, Lister was prejudiced against Sydenham, as Sydenham supported the Parliamentarians during the Civil War and was a Puritan. Lister used the term “sectaries” for him and his admirers in 1694, even five years after Sydenham’s death.\footnote{Encyclopediab Britannica, 11th ed. (New York: Encyclopedia Britannica, 1911). s.v. “Thomas Sydenham.”}

Having dismissed the theories of Willis and Sydenham, Lister offered one of his own, stating, “what is left then, is the notion that the infection is first produced by some poisonous insect.”\footnote{Lister, *Octo exercitationes medicinales*, p. 274.} In this hypothesis, he demonstrated a novel ontological understanding of the “collective entities” of medicine and natural history.\footnote{M. Foucault, *The Birth of the Clinic* (New York, Routledge, 1973), p. 135.} Lister had received letters from naturalists John Banister and James Petiver (1663-1718) in Maryland describing the decimation of Native Americans exposed to smallpox by colonists.\footnote{Banister also gave Lister several natural history specimens. See J. and N. Ewan, *John Banister and his Natural History of Virginia 1678-1692* (Urbana, University of Illinois Press, 1970), pp. 318-319.} For Lister, their lack of immunity showed that the disease was not ‘communicated to individuals from some internal bodily cause or defect of character . . . but by some contagion externally applied’.\footnote{Lister, *Octo exercitationes medicinales*, p. 271.} This contagion, he postulated, could be via an insect or poisonous animal [*bestiola*], ‘either
as a result of its being eaten, or from its bite and that it then spread to all mankind'.

After all, the application of Spanish flies to the skin resulted in a blistering rash which was similar to smallpox pustules, and he classified a number of diseases noting that ‘most of the indications of persons infected with smallpox are common to those bitten by poisonous beasts’ comparing the rashes’ appearance with insect bites. As Lister himself had reported when writing his tract on spiders that he had been stung many times, his description that ‘the part bitten by a phalangius [a poisonous spider] grows red, and develops what look like needle-points’, and is accompanied by difficulty urinating, was borne out of direct experience. He had reported the therapeutic uses of spider venom in his tract on arachnids in a previous publication, his Historia Animalium (1678), so it is little wonder he made these connections between insects and disease. Pages of his treatise on smallpox were devoted to classifications of the effects of the bites of poisonous insects and animals, and comparisons of their side effects to current maladies. He also noted that many insect and snake poisons affected the parts of the body that were attacked by smallpox; just as smallpox affected the genitals, ‘the bite of the viper, irrespective of where on the body it is inflicted, always concludes with a swelling of the scrotum and an abundance of burning urine’. Lister’s remarks were a creative riff on Francesco Redi’s work on vipers that he read as a student in Montpellier. Comparison of ancient medical authors to physicians of his time also revealed that the medications employed to treat poisonous bites were much the same as those in use to treat smallpox; opium in wine, concoctions of figs being particularly popular concoctions to treat the copious vomiting which accompanied the maladies.

Though the ultimate origins of smallpox were due to insect and poisonous animal vectors, Lister realized this was not the means by which it spread, due to the relatively low incidence of poisonous insect bites in the population. He did notice that some families seemed more readily infected than others, and speculated if in some cases proclivity to the disease could be inherited, but acknowledged this was probably a rare occurrence. Weighing his observations, Lister then concluded that direct contact with the breath or pustules of a person infected by smallpox was the main secondary source of transmission, writing:

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46 Lister, Octo exercitationes medicinales, p. 277.
47 Parker, Martin Lister’s English Spiders (1678), pp. 38-40; p. 68.
48 Lister, Octo exercitationes medicinales, p. 273.
Smallpox then consists of poisonous pustules, initially transmitted to mankind by (let us say) an insect bite, and now only very rarely transmitted spontaneously from infected parents as a sort of inherited calamity, and most often transferred from a person with smallpox to another person by the effluvia he makes into the air, outside the body, and forced from the excretory ducts accompanied by an inevitable unrelenting fever.⁴⁹

Although it was by circuitous means, Lister was one of the first physicians to suggest the correct means of transmission of the disease.⁵⁰

Lister also had some perceptive observations about the epidemiology of smallpox, noting that the intervals of 3-4 years between several smallpox plagues were due to

the fact that all the children of, say, one house, town or city (with the exception of London, on account of its enormous size and large numbers of newcomers constantly arriving) succumb within a few months or a year, leaving no others to be infected there. The disease therefore dies down after a proportional period of time until a new generation is born to receive the infection.⁵¹

Lister’s claim that the Arabs were the first to describe smallpox was also essentially correct as the first recorded epidemic took place in Arabia in the sixth century, and the first clear description was from the Islamic physician Rhazes in the tenth century.⁵² His opinion about the origins and duration of the disease were, however, controversial, part of an ongoing debate that lasted until the nineteenth century about the antiquity of the disease itself and whether it was known before Rhazes’ description.⁵³ Lister’s opinions

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⁴⁹ Ibid., pp. 282-3.
⁵⁰ This is also noted by F. Sereni, M.D, and L.P. Sereni, M.D., ‘Exanthematous infectious diseases in pediatrics: curiosities from the old pediatric literature’, Pediatric Infectious Disease Journal, 23 (2004), 350-54 [at 353].
⁵² Ibid., p. 266. For Arab reports of the disease see A. M. Behbehani, ‘The Smallpox Story: Life and Death of an Old Disease’, Microbiological Reviews (December 1983), pp. 455-509 [at 457].
attracted the attention of the eminent physician Archibald Pitcairne, the Scottish professor of medicine in Leyden. Pitcairne in his correspondence commented that while he was ‘perfectly pleased’ with Lister’s argument that the disease was ‘unknown to the ancients before the Arabian age’, it was possible that ancients simply did not have the medical knowledge to identify the disease. Smallpox could also be easily confused with chickenpox. Pitcairne did however admire his observations ‘free and bold thoughts about the materia medica’, and of his description of the disease’s course. Lister was particularly detailed concerning the appearance of the pustules, due to his comparison of them to insect bites.

**IV. Lister’s conceptions of syphilis**

Lister’s work was in fact one of the earliest works to attempt to distinguish systematically between syphilis (the great pox) and smallpox via a detailed examination of the skin lesions they produced. It can be challenging for modern medics to differentiate secondary syphilis from smallpox or chickenpox, and the National Center of Disease Control has made available a poster, "Evaluating Patients for Smallpox," designed to reduce the risk of misdiagnosis. Lister’s identification of necrosis and blood poisoning from the pustules’ appearance also corresponds to modern conceptions of its etiology.

Although he thought the disorders of smallpox and syphilis were different due to the dissimilarity of their rashes, he believed the origins of both diseases were due to animal transmission. In his tract on syphilis, he realized like other physicians that the disease was usually spread via:

sexual intercourse, . . A man who has intercourse with a diseased woman is infected with syphilis through the genitals; the wet-nurse, from whom a diseased infant sucks, is infected through her breasts; the infant suckled by a diseased nurse is infected both through the mouth and the inner parts; a person sleeping with a syphilitic is covered with diseased sweat on the skin and surface regions; a man who ingests saliva from a passionate kiss is infected through the mouth.

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54 MS Lister 36, fols. 126 r and v, Bodleian Library, University of Oxford.
55 MS Lister 36, fol. 135r. Bodleian Library, University of Oxford.
However, he still believed the very origins of this venereal disease were due to animal vectors. He wrote:

Nobody now doubts that it [syphilis] was brought to Europe by the Spaniards from the islands of America, in which before the arrival of the Spaniards this affliction rampaged through the population.  

Lister concluded that the disease first arose ‘either from the bite of some poisonous animal or at least from some poisonous food’. Here he again disregarded Willis’s idea that the disease originated in fermentation in the woman’s womb; Willis postulated that the heat and moisture engendered in a promiscuous woman during the sexual act led to fermentation, purification and agitation of the venereal poison. Lister, like most contemporary opponents of the fermentation theory:

opposed it because it logically disagreed with the American origin of the disease. Such logic ran: since there have always been promiscuous women, the pox should have always existed.

But the pox first appeared in 1494, and therefore the fermentation theory must have been wrong.

In formulating his theories about the origins of the disease, Lister was also influenced by Gonzalo Fernández de Oviedo’s (1478-1557) first comprehensive history of Spanish America, the Historia general y natural de las Indias. In fifty volumes, Oviedo attempted to provide a complete account of the Spanish discovery, conquest, and colonization of the Americas from 1492 to 1547, along with descriptions of the land's fauna, flora and indigenous peoples. Oviedo observed that Native Americans ate snakes ‘of which there are innumerable new species unknown to us among

58 Ibid., p. 134.
59 Idem.
61 Ibid., p. 569.
the Indians’ so Lister considered it probable that syphilis resulted from eating such ‘unclean food’. 63  Lister then reported that Oviedo:

gave a precise description of the iguanas of West India, which are no mean little beasts in the category of four-footed serpents [i.e. reptiles]. The Indians eagerly ate them and considered them a delicacy. Yet the Spaniards followed their example and made the animal part of their diet too, for they tasted quite pleasant, and were much tastier than rabbit meat. Indeed, he says, eating them harms nobody, excepting those thereby infected by syphilis, and although these persons enjoyed a respite from the disease for a long period, it was nevertheless responsible for some immediate initial damage, and after the affliction has been inactive for several years it once more awakes and is renewed. This has been the fate, he says, of countless of our own people. Such are his words. It is then certainly not absurd to believe that syphilis has its origin in a similar cause, if not that precise one, since the damage which was initially caused by eating them was re-activated after appearing for a long time to be dead. 64

Evidently Lister thought that the periodic nature of syphilis may have been caused by intermittently including the reptiles on the menu.

He then noted that the genital warts of syphilitics looked like the iguanas’ crests, and the victims were said to find iguana flesh repulsive. This repulsion according to Lister was:

of course . . . a specific representation of the animal from which the illness took its origin. These crested evil things are probably reckoned by others as genital warts and piles, even though they usually do not involve any pain or what I might call a thinning of the membrane. 65

Lister mentioned in support of his argument that it was not unusual for poisonous animals to impart the particular and especial characteristics of contagion. His essay on hydrophobia in his medical tract had demonstrated that in the case of hydrophobia, ‘sufferers show a dog-like voracity in swallowing down food, and a tendency to lap, rather than drink, by

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63 Lister, Octo exercitationes medicinales, p. 134.
64 Ibid., pp. 135-6.
65 Ibid., p. 136.
continually sticking out the tongue’. Those bitten by tarantulas, he also noted:

suffer from an unceasing desire to jump, and the gait of spiders of this type is simply a jumping from place to place like a flea. I am well aware that this is considered by certain learned men as a mere fairy-tale, but certainly not by me, for I have investigated the ways of spiders a little more closely than the rest.

The permeable boundaries between humans and animal forms that he suggested also reflected a myth, first proposed by sixteenth-century physician Leonard Fioravanti, that cannibalism was the origin of syphilis, and demonstrates early modern racism and the inherent cultural slippages between human, ‘subhuman’ and animal forms and behaviors that it represented. Orviedo had been the first person to ‘advance the view that syphilis originated in America’, shifting blame for it onto a foreign ‘Other’, indigenous peoples that seemed to transverse the boundary between civilized humankind and wild nature. Lister’s medical opinions also reflect his work in taxonomy, in which the Aristotelian chain of being was being slowly broken by new categories and the boundaries between human, animal, vegetable and mineral readjusted and reclassified for both cultural and for scientific reasons. Crinoid “rock plants” or sea lily fossils that looked like botanical specimens, plants with circulatory systems, parasitic wasps that raised questions about spontaneous generation, symptoms of human disease evoking animal behavior - all of these phenomena were part of Lister’s mental world. These permeable boundaries of classification

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66 Ibid., p. 136.
67 Ibid., p. 136. Lister was referring not only to his work on spiders in his *Historia Animalium*, but to an article he had written about tarantulas for the *Philosophical Transactions*, in which he queried if the tarantula was in reality related to a six-eyed jumping spider. See M. Lister, ‘Some Additions of Mr. Lyster to his former Communications about Vegetable Excreences, and Ichneumon Wasps; together with an Inquiry concerning Tarantula’s, and a Discovery of another Musk-sented Insect; transmitted to the Publisher from York in two letters, of Octob. 16. and 28. 1671’, *Phil. Trans.*, 6, 77 (1671), 3002-3005 [at 3002].
combined with his interest in arachnology made the possibility of insect vectors for smallpox and syphilis utterly probable.

While Lister’s theory of the origins of the disease was highly original, his treatment for syphilis was also atypical, part of that ‘free and bold’ discussion of pharmaceuticals that Pitcairne admired. While he advised the traditional use of mercury to treat syphilitic pustules was necessary, he advised that it be taken in tandem with Peruvian balsam or guyac, an evergreen resin obtained from *Myroxylon balsamum* in El Salvador and shipped by Spanish explorers from Peruvian ports. The balm was first mentioned in England in 1666 in correspondence between Robert Boyle and his protege, Dr. Daniel Coxe who noted that it stopped bleeding. The chronic salivation, bone loss, and sluggishness experienced by patients given mercury convinced Lister that its poisonous effects could affect the body years after it was initially was administered, and was ‘wont to lie hidden in the twisting of glands and other recesses of the body’, when ‘it finally moves its station on some occasion and once more makes its nature felt.’ However, ‘if any mercury has ever been taken either internally or has been applied to the body externally, it is roused from its lair by the use of guyac’. Lister conceived of guyac as a peppery resin consisting of thin particles that could:

- cure the stupidity brought on by mercury, and to digest mercury, which in itself is a heavy and sluggish medicine, and to spread it into all parts of the body, and finally to expel it by heating, penetrating and strengthening the internal organs and their vessels. Therefore the guyac of mercury, like the mercury of poison, is an antidote in the case of syphilis. When the internal organs have once again been invigorated they finally compel the mercury itself, which is an inert and alien guest in the body, to circulate, to prevent it spending an eternal night of rest within us, and, when it has been particularly rarefied by sweat, they expel it in either the urine or some imperceptible gas.

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72 Lister, *Octo exercitationes medicinales*, p. 158.
73 Idem.
74 Idem.
Lister’s analogy of the mercurious poison and its antidote which worked in tandem chemically to cure syphilis may have been inspired by the iatrochymistry of his colleague Thomas Willis. Though Lister rejected Willis’s hypothesis that morbific matter in the blood from menstrual discharge caused syphilis or smallpox, Willis used a similar analogy of poisons and antidotes in his analysis of the use of Peruvian Bark in treating syphilitic and other fevers. Willis postulated that fever arose from excessive fermentation or bubbling in the blood. The blood of the patient then turned so salty that it could not absorb nutrients from the intestine; the resultant extra nutrients then in turn became even more morbifican, causing unnatural blood fermentation. Willis thought that if patients took Peruvian bark repeatedly, the particles would enter the blood, causing a new fermentation or invigoration. ‘The particles of the blood’, though ‘distempered with an evil disposition’, were agitated and altered in such a way that they were enabled to concoct ‘in some measure’ the nourishable juice and to evaporate its excrement. Just as Lister’s Peruvian balsam dispelled the extra poisonous mercury in the body by its brisk action, the Peruvian bark dispelled the morbific matter in the blood. Willis also compared the action of the bark with antidotes to animal bites, which retained the venom of a mad dog’s bite or of a poisonous sting in ‘another Fermentation’, preventing it thus from producing harmful symptoms; as the antidote wore off, so the fever would return, ‘when the particles of the Peruvian bark had “wholly flown away” from the blood’. Similarly in Lister’s model, when the Peruvian balsam wore away, the effects of the mercury would return, which is why Lister recommended frequent administration of balsam in wine to syphilitics.

Although Lister claimed he did not like to promote medical books, his description of a ‘new’ method of treating syphilis was likely done with the medical marketplace in mind. Because syphilis was diagnosed and treated primarily on an external appearance, it generally was considered among the preserve of surgeons. As venereological care was quite lucrative, however, physicians wished to expand their practice into this area. Though many doctors, surgeons, and empirics prominently advertised their unique or secret

76 Ibid., p. 231.
77 Idem.
cures for the pox ‘even offering directions to back-door entrances to allow gentlemen the utmost discretion’. Lister took a more subtle approach more in keeping with his elite clientele. By publishing a learned work in Latin describing an innovative treatment using an exotic ingredient like Peruvian balsam, his personal reputation as a specialist in treating venereal disease was enhanced. 

His ‘free and bold’ use of medicaments, as well as an iatrochymical focus also shaped his treatment of scurvy. Because it was associated with sailors and had some similar symptoms, scurvy was often confused with syphilis; Lister noted in the preface of his tract in the *Octo Exercitationes Medicinales* that:

I have placed scurvy adjacent to the chapter on venereal disease, because of the newness of the disease, and because both are so closely related and have so many symptoms in common that they are not readily distinguished from each other, except by an experienced physician.

For Lister, the cause of scurvy was the eating of overly salty food, common on sea voyages, a conceit he took from ancient author Pliny and sixteenth-century physician Eugalenus. Though he again disagreed with Willis that the disease itself caused fermentation of the blood resulting in salty residues in the bloodstream, the eating of excessively salty foods caused essentially the same effects, namely a ‘saltiness of blood that moves only with difficulty’ which stagnated and clotted in capillary vessels and excretory ducts, forming the purple spots on the skin characteristic of the disorder. 

To cure the disease, he utilized acids such as vinegar which his experience with salt chymistry taught him would ‘combine with urinous salts and destroy their power’. The therapeutic use of acids to dissolve volatile alkaline salts was common in early modern medicine, propounded by not only Willis, but also by Sylvius de la Boë whose acid-alkaline iatrochymistry, as taught at Leiden, was particularly influential. Lister, however, found via empirical observation that some acids were better than others, namely that in the citrus fruits, particularly in lemons ‘reside a

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79 Siena, ‘Pollution, Promiscuity, and the Pox’, p. 566.
81 Ibid., p. 162.
82 Idem.
special exotic principle curative of scurvy superior to bezoartic stones or theriacs . . .'  

Lister was certainly not the first physician to recommend lemons for scurvy, as he cites similar observations made by Willem Piso. Piso published his own accounts, as well as the investigations of other natural historians and physicians exploring the East Indies and Dutch Brazil to ‘promote public interest in the Dutch West Indies’, and he mentioned colonial doctors who had noted the beneficial effects of citrus fruits in treating illness. The rise of commerce and trade in the Netherlands encouraged a wave of new scientific investigation, something that was certainly true for Lister in this case.

Entomology, discoveries in the New World, and an interdisciplinary approach to knowledge characterized the medical work of Martin Lister. In our own era of specialization, it is easy to forget what it was like to live in an era where, as Francis Bacon said, one could take ‘all knowledge for one’s own province.’ With verve, some unusual ideas, and with keen empiricism, our spiderman attempted just that, a virtuoso in the truest sense of the word. Lister’s interest and expertise in natural history was also reflective of its ‘becoming the foundation for a great deal of contemporary science, including medicine’; as Cook has remarked, natural history was the early modern equivalent of ‘big science’, and though forgotten today, in the seventeenth century, Lister was at its centre.

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84 Lister, *Octo exercitationes medicinales*, p. 179.
85 Idem.
87 Idem.