

## LANCISI AND SCABIES

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- *Sarna*
- *Lancisi*
- *Bonomo*
- *Cestoni*
- *Contagi*

**LANCISI I LA SARNA. RESUM:** Durant la major part de la història, la comunitat mèdica va considerar la sarna com una malaltia de la sang o d'humors alterats. Els avenços en microscòpia i una creixent apreciació del contagisme van portar els italians Bonomo i Cestoni, el 1687, a proposar que la sarna era causada específicament per l'acció d'un àcar a la pell. La seva hipòtesi va ser rebutjada pel metge papal Lancisi, que no va reconèixer la sarna com una entitat específica diferent.

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**LANCISI Y LA SARNA. RESUMEN:** Durante la mayor parte de la historia, la comunidad médica consideró la sarna como una enfermedad de la sangre, o por humores alterados. Los avances en la microscopía y una creciente apreciación del contagionismo llevaron a los italianos Bonomo y Cestoni, en 1687, a proponer que la sarna estaba causada específicamente por la acción de un ácaro en la piel. Su hipótesis fue rechazada por el médico papal Lancisi, quien no reconoció la sarna como una entidad distinta y específica.

**KEYWORDS:**

- *Scabies*
- *Lancisi*
- *Bonomo*
- *Cestoni*
- *Contagionism*

**ABSTRACT:** For most of history, the medical community regarded scabies as a disease of the blood, or altered humours. Advances in microscopy and a growing appreciation of contagionism led Italians Bonomo and Cestoni, in 1687, to propose that scabies was specifically caused by the gnawing of an itch mite in the skin. Their hypothesis was rejected by papal physician Lancisi, who failed to recognize scabies as a specific distinct entity.

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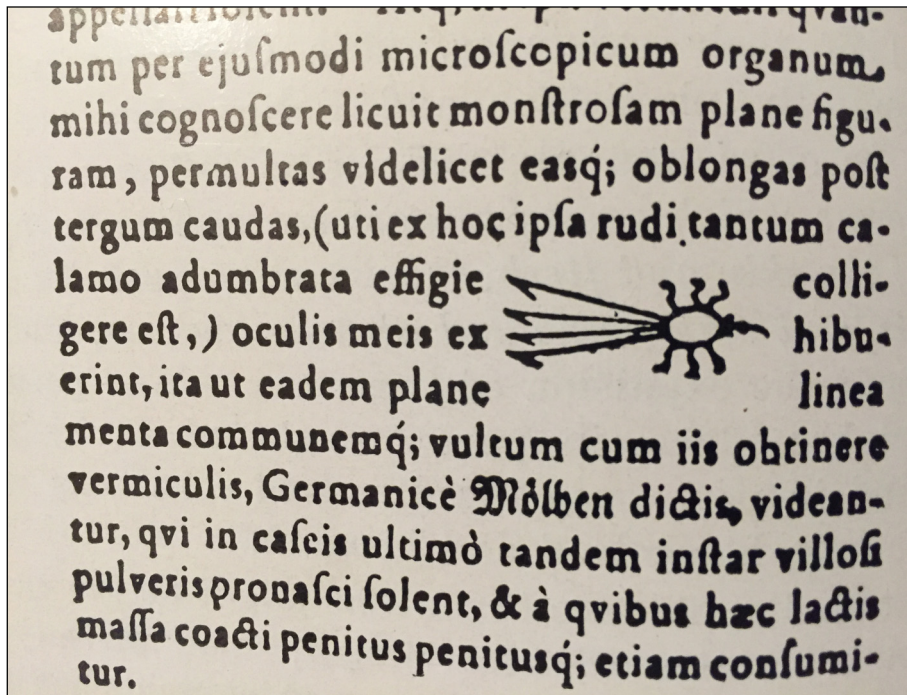
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## INTRODUCTION

The skin disease scabies, today, is universally understood to refer to the itchy and contagious rash caused by the parasitic mite *Sarcoptes scabiei*. However, this has not always been the case. Since the time of antiquity, scabies has been known as an itchy, often pustular disease leading to the formation of scabs on the skin. The term derives from the Latin 'scabere', meaning 'to scrape', or 'to scratch'. The earliest writings about scabies however, reveal confusion as to its underlying cause. For example, Aristotle wrote about an entity ('akari') that had characteristics of both scabies and lice simultaneously. Ancient Romans accounts reveal even less understanding using the term 'scabies' in a rather more non-specific fashion to include a variety of itchy scaling, pustular, or ulcerative disorders of the skin.

One of the earliest recorded descriptions of scabies compatible with our modern understanding comes from that writings of the 10th Century Persian physician al-Tabari (Friedman). al-Tabari's describes "bloody scabies" as a condition presenting with furrows in the skin, from which an animalcule can be removed. However al-Tabari additionally discusses nine other variants of scabies (granular, bloody, fiery, moist, dog, lepra, papulopustular, oozing, flat) which are less recognizable to the modern reader and likely represent other disparate conditions (one of which is possibly impetigo). Thus in fact, for most of its history, scabies was used as a catchall term to describe a wide variety of skin diseases, including those caused by the acarus. It would not be until the groundbreaking studies of Ferdinand von Hebra, published in 1844 that scabies as a disease process evolved to carry a narrow and precise definition.

Because the term scabies was used somewhat non-specifically and because early accounts of scabies tended to be accordingly nonspecific, it is difficult to pinpoint with any accuracy when the underlying cause of scabies was first truly discovered. At the minimum Hauptmann's 1657 sketch of the scabies mite, might be considered a good, albeit arbitrary starting point (Fig. 1). However, unrecorded and without fanfare, village elders and peasant women had been known to relieve scabies by extracting minute brown spots out of the skin of affected patients in a variety of societies. It is unknown how long back this practice dates. For this reason it seems absurd to credit any given individual as the discoverer of the itch mite. From the 1500's onward, references can be found of physicians and other healers removing the itch mite from affected patients with a fine needle. However, physicians who were in fact aware of the presence of the acarus in lesions of scabies generally saw no causation between the mite and the disease. For these doctors the acarus was thought to be a by-



**Figure 1.** First known drawing of the scabies mite by August Hauptmann (1607-1674).

product of the skin disease. The widely accepted Aristotelian dogma of spontaneous generation provided that living organisms could derive from non-living material. Any mites found in lesions of scabies could be regarded as an incidental finding. In the same way that maggots found in a wound are not its cause, the same logic could be used to explain away the presence of the acarus in scabies lesions. For the vast majority of medical and learned men of the day, the cause of scabies was disordered blood, and more specifically imbalanced humors, a concept dating back to Galen.

In Renaissance Italian city states, experimental science flourished and thus knowledge regarding scabies was perhaps the most advanced. The well-known and respected Tuscan naturalist Francesco Redi (1626–1697) made observations which called into question the dogma of spontaneous generation. Noting that butchers protected meat from spoilage in the summer by covering it with white cloth, Redi created a simple experimental setup where flies either had direct access to rotting meat at the bottom of glass jars or did not due to the presence of a thin layer of white cloth. Redi noted that maggots only developed on meat to which flies had direct

access. Cloth protected meat developed no maggots. From this, Redi noted that maggots came directly from flies, rather than spontaneously generating. He summarized his conclusions as, 'all life comes from life' (Omne vivum ex vivo).

## THE FIRST WORKS

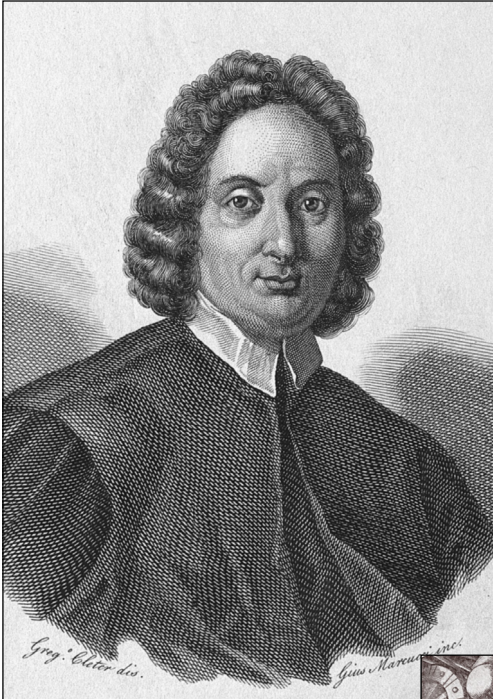
It was in this intellectual milieu that the first written work conveying a true understanding of etiopathogenesis of scabies is to be found. The Italians Giovanni Cosimo Bonomo (1663–1696) and Diacinto Cestoni (1637–1718) produced the first comprehensive and convincing description of the scabies mite and the disease it causes. Bonomo was a physician who trained in Pisa, and spent time working on slave galleys in the Tuscan port of Livorno. Bonomo observed prisoners and sailors extracting minute items from each other's skin to relieve their itch, 'as a matter of mutual kindness' (Mead). Cestoni was a pharmacist and naturalist, and held influence amongst intellectuals in Livorno; perhaps most importantly he possessed a microscope, a relatively unknown instrument, and actually knew how to use it (Fig. 2). Bonomo and Cestoni's skill sets, when put together, provided the perfect combination to devise a cogent scientific explanation of scabies. They concluded that scabies was simply an itchy skin disease caused by the presence of a microscopic mite chewing its way through the skin. They published their observations in a pamphlet in Florence on 18 July 1687 as an open letter to Redi, who had taken interest in their findings. Entitled, *Osservazioni intorno a' pellicelli del corpo umano* (Fig. 3), Bonomo and Cestoni listed nearly all the salient points of scabies as we know it today, describing its features far more thoroughly than ever previously done, and attributing the acarus as its direct cause. Moreover they brushed aside and dismissed alternative incorrect theories of the day in a full frontal assault on ancient and contemporaries authorities alike. Bonomo and Cestoni wrote that scabies had nothing to do with the imbalance of Galen's humors, nor Sylvius' corrosive acids, nor Van Helmont's ferments; rather it was due to, 'no other than the continual biting of these animalcules'. Though they were not the first to make note of the acarus in scabies, Bonomo and Cestoni demonstrated, in writing, the first comprehensive understanding of the pathology of scabies. Hence it is reasonable to consider Bonomo and Cestoni the discoverers of the acarian origin of scabies. Or at least the first to commit their knowledge to print. However, these advanced ideas were disseminated into a void. The medical mind of the time was by no means ready to digest and incorporate this information into its worldview. The face of this resistance took form of the eminent physician and scientist Giovanni Maria Lancisi (1654-1720) (Fig. 4), who in retrospect is in fact viewed as a progressive figure of his day.



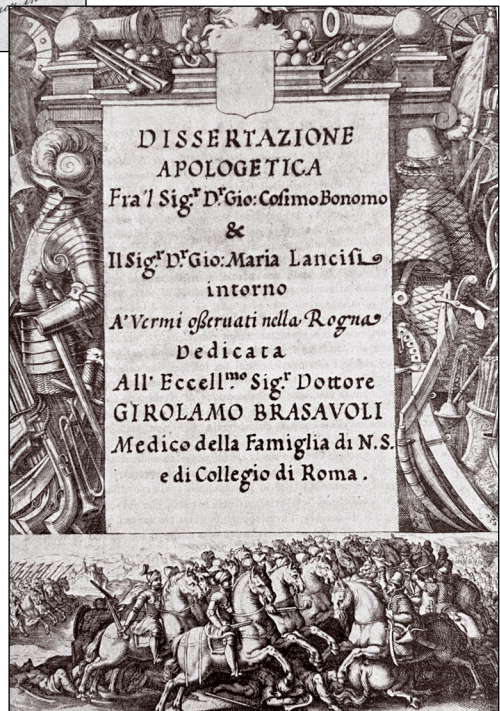
**Figure 2.** Portrait of Diacinto Cestoni.  
No known portraits exist of Giovanni Cosimo Bonomo.



**Figure 3.** Osservazioni intorno a' pellicelli del corpo umano (1687).



**Figure 4.** *Giovanni Maria Lancisi.*  
[Reproduced under a Creative Commons Attribution 4.0 International license from R. Burgess, *Portraits of doctors & scientists in the Wellcome Institute, London 1973, no. 1668.1*.]



**Figure 5.** *Apologetic dissertation between GC Bonomo and GM Lancisi.*

Giovanni Maria Lancisi started out life under modest circumstances. Orphaned after his mother died in childbirth, Lancisi lived in Orvieto as a boy, and moved to Rome at age twelve. Showing great aptitude, he studied natural sciences, anatomy, chemistry, and botany at *Collegio de la Sapienza*, where he received a doctors degree, in philosophy and medicine, at age eighteen. He was a skilled anatomist and was appointed professor of anatomy at age thirty. Lancisi, throughout his career, made many contributions to modern medicine; he is perhaps most famous for his studies on the pathophysiology of the heart. In the years of 1705-6 an epidemic of sudden death erupted in Rome. This coincided with The War of Spanish Succession, a particularly stressful time. Sudden death was seen as a sign of divine punishment. Alarmed, Pope Clement XI tasked Lancisi with investigating the cause of this epidemic to minimize full-fledged panic. Through his liberal employment of autopsy as a technique to understand disease, Lancisi determined that sudden death resulted from structural anomalies of the heart and great vessels. In 1707, Lancisi published his landmark treatise of the heart *De Subitaneis Mortibus*, which is widely considered to have birthed the field of modern cardiology (A. Paleari). Lancisi made additional significant contributions in nephrology, neurology, infectious disease, and epidemiology (Z. Klassen).

However, prior to his profound investigations of the heart, Lancisi found himself in the position of being the arbiter of Bonomo and Cestoni's "new" ideas regarding the cause of scabies. At the time, Bonomo, Cestoni, and Lancisi were all members of the Roman Medical Council, a forum for discussing and propagating new and important medical ideas. In August of 1687, Bonomo wrote to Lancisi asking him to disseminate his newly published work on scabies to the Roman Medical Council for evaluation. At this stage of his life Lancisi carried the official title of papal archiater, and thus was the personal physician of the Pope. Lancisi represented the medical authority to which Bonomo and Cestoni were submitting their ideas and accordingly seeking acceptance. Lancisi and Bonomo proceeded to exchange a series of letters in the fall of 1687, in which they debated the topic of scabies in general, and more specifically on the role of the acarus in the disease. Their correspondence was compiled into a pamphlet entitled, *Apologetic dissertation between... GC Bonomo and...GM Lancisi* (Fig. 5), which for years has rested in the Lancisiana Library, located in the Santo Spirito Hospital in Rome (La Polemica Bonomo). Ultimately Lancisi rejected Bonomo and Cestoni's acarian hypothesis of scabies. A close examination of this pamphlet reveals the thought process of Lancisi and his medical colleagues from this time.

Lancisi's original assessment of Bonomo and Cestoni's findings was that he was impressed with their originality and learnedness. He brushed aside the objections

of his colleagues who distrusted microscopy writing that this new scientific technique counted as one of the wonders of the century (*“del microscopio, che appunto è una di quelle invenzioni, che, si come hà ingrandita la gloria del nostro secolo, così la farà invidiata da venturi”*). Lancisi did not doubt that Bonomo and Cestoni had in fact observed mites in the lesions of scabies. Lancisi noted that others were aware of the itch mite. One Council member reported knowing a woman in Rome whose specific job was to extract mites from the skin of scabies sufferers. Another claimed to have had scabies himself, and under the optimal lighting conditions claimed to be able to see the mites in his skin. Overall, it appears that Lancisi gave Bonomo and Cestoni's ideas fair consideration, but ultimately rejected them.

Why exactly did Lancisi reject Bonomo and Cestoni's acarian hypothesis? It is tempting to postulate that Lancisi considered the case of scabies to be settled, and not deserving re-examination. However, this is not compatible with other aspects of Lancisi's career. During his life, Lancisi directly challenged some fundamental medical preconceptions. For example, he rejected the doctrine of *'cor aegrotari non potest'*-that is to say the idea that the heart could not be subject to disease. In other areas Lancisi challenged previously held beliefs, such as that of Descartes who postulated that higher mental functioning arose from the pineal gland. Based on his prowess in autopsy, Lancisi correctly suggested the area of the brain responsible for such activity was in fact the corpus callosum. Thus here we see several examples of how Lancisi was not beholden to the status quo.

The best explanation is that Lancisi, like most other physicians of his day viewed scabies as a general category of skin diseases and not an entity sui-generis. Lancisi believe that the acarus could be found in some cases of scabies lesions, but was not an integral and necessary component of the disease, and was not a disease defining characteristic of scabies. Fundamentally, Lancisi subscribed to the Galenic concept that scabies was a disease of the blood. Lancisi wrote (correctly) that the pustules seen in scabies consisted of skin elevations caused by a collection of serum under the skin. And while he believed this could be due to worms in the blood, the lesions of scabies could also be due to other factors causing blood disturbances. According to him, other possible causes included body fluids becoming sour or corrosive, abnormal dietary practices like eating too much salt or drinking too much wine, or even external agents breaking the skin from the outside (such as nettle spines). Lancisi believed that worms in the blood were but one possible cause of scabies. When in the course of their discourse Bonomo admitted that he couldn't find a mite or at least its egg in every skin lesion examined, Lancisi took this as further



evidence to support his idea that worms in the blood were but one of many possible causes of scabies. Interestingly later in his career Lancisi would come to similar reservations about animalcules causing epizootic disease of cattle (Rinderpest), as well as malaria. Although he endorsed studying these diseases with microscopy, in both instances he stated that he could not assign causality to the presence of microorganisms ('worms') even if found (Wilkinson).<sup>1</sup> As Margaret Delacy points out in her books on the history of contagionism, Lancisi and many other leading thinkers of the day were agnostic on the nature of pathogenic substances (Delacy).

Bonomo's response to Lancisi's rejection reveals an attempt to win over the famous papal physician with an appeal to logic and reason. Bonomo wrote Lancisi back, and stated that while it was true that he was unable to find mites in all lesions, he additionally noted that the mites create pathways between lesions, and thus can make multiple scabies lesions, without being to inhabit them all simultaneously. But likely the true reason that Bonomo couldn't find a mite in every lesion he examined was that he did not realize the optimal place to search for mites was at the end of burrows. It is likely that Bonomo looked indiscriminately for mites in multiple areas including the small blisters or pustules they cause. Today we recognize these blisters as being immunological reaction that mites cause and not the precise spot to locate them.

Additionally, Bonomo rebutted the paradigm that scabies was a disease of the blood by pointing out that, in his hands, scabies could be repeatedly and consistently cured by external treatments alone. Here Bonomo seems to have made the assumption that topical treatments would have no systemic efficacy. Moreover Bonomo very logically noted that while he could not claim that all itchy skin bumps are all cause by the acarus, those itchy bumps caused by other (internal or external) causes should be labeled as other diseases. Bonomo and Cestoni had the insight to narrowly define scabies in these terms.

If he were hoping that Lancisi would accept his logic. Bonomo must have been disappointed by his reply. Lancisi very conservatively cautioned Bonomo not to be overconfident and assume his recent observations invalidated the wisdom of the ancients. Lancisi pointed out, rightly so, that they disagreed on what exactly the true nature of scabies is. While Bonomo preferred a narrow definition, Lancisi continue to believe in scabies as a catchall term. And thus accordingly for Lancisi, the optimal treatment for scabies varied. While external remedies might help in some cases, when scabies were due to internal causes, i.e. those precipitated by rotten food or corrupted body fluids, external treatments would be useless and in fact dangerous as

they prevent the healthy evacuation of fluids. Lancisi pointed to various references that demonstrated that the quick suppression of mange can lead to palpitations, convulsions, madness, blindness, apoplexy, dangerous fevers, and other illnesses. Lancisi suggested Bonomo read, or re-read, various passages written in classical antiquity by Plutarch and others. Lancisi, it appears, could not shed his classical training, and continued to rely heavily on the wisdom of the ancients.

Lancisi lived in a time of medical and scientific transition. While his autopsy studies led to some profound insights, his understanding of contagion appears jumbled and confused to the modern reader. This confusion was by no means particular to Lancisi alone. Contagionism (and animalculism) were newly emerging ideas that, while gaining proponents, were far from being widely accepted. The majority of physicians and scientists would have agreed with Lancisi that scabies was a general class of itchy skin diseases and could not possibly be explained by the gnawing through the skin of a mite. By dismissing Bonomo and Cestoni's hypothesis, Lancisi permitted the confusion regarding the cause of scabies to persist, which amazingly, would not be fully cleared up until von Hebra's groundbreaking work on scabies in the mid nineteenth century.

Lancisi's rejection of Bonomo and Cestoni's acarian hypothesis of scabies represents an unfortunate setback in the history of scabies, infectious disease, and medicine in general. Essentially what should have been a landmark publication and the first convincing description of an infectious disease languished, mostly ignored. A summary of *Osservazioni intorno a' pellicelli del corpo umano* was reported to the Proceedings of the Royal Society by the English physician Richard Mead, who had undertaken medical training in Italy, thereby introducing Bonomo and Cestoni's groundbreaking ideas into the English speaking world. Translations into French and Latin were also made. Despite this Bonomo and Cestoni's findings did not gain traction, and would require nearly a century and a half to be taken seriously, by new set of actors, at a faraway academic institution, in an entirely new era (Craig).

## CITATION

1. In studying those with malaria, Lancisi suggest that 'insects' in the blood would not necessarily be the cause of the disorder but could be either from spontaneous generation or as Wilkinson points out due to external airborne contamination (of the kind seen in Redi's experiments). Lancisi wrote:

"... it would be necessary that the blood of those suffering from marsh fevers should be let, which medical reason seldom admits; and to carefully examine the blood with a

microscope for insects of this kind, if such there be. But, although worms might be seen in the drawn blood, it would still be doubtful that these insects should be considered as the cause of the evil; or whether, which I consider more probable, it is the product of the breaking down of the fluids; whence all the minute ovules, after they have been wrapped up in particles of the blood, are set free or are supplied from the external air. I can therefore form no opinion from autopsies whether these diseases are carried by insects into the blood.” (Wilkinson).

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