Francesco Redi: A Scientist at the Medici Court

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ABSTRACT

Francesco Redi (1626-1697) was a scientist and writer of highest level. He spent his career at Medicean Court, where he developed a profound literary and philological knowledge, but specialising in the life sciences. Redi brought together erudition and a genuine experimental spirit, being the first to apply the experimental method to the life sciences. It was above all during the reign of Ferdinando 2\textsuperscript{nd} that Redi could claim the necessary financial and logistic support for his research. Redi was a member of the Arcadia Academy and of the Crusca Academy, but he was the animating spirit of the famous Accademia del Cimento. The latter dedicated to experimental science, if of short existence, was nevertheless the Medicean Court’s institutional expression of its own image of scientific renewal of the period. Serving as the Court’s Archiater for all his long career, Redi developed many princely contacts, and not only those related to science or to his medical profession. He was part of movement in Europe according to which political power was obliged to measure itself against science in pursuing prestige and external image. The notion of experiment in 17\textsuperscript{th} siecle was integrated with the exploration of the sensible and with the searching of sensational, a kind of sensory and theatrical spectacle. But Redi’s science was not only thus, a great part of his research was pursued for love of knowledge’s love, beyond the restrictions of the courtly life, as is the case in his morphological and anatomical researches.

1. REDI AND THE MEDICI COURT
2. REDI POLYEDRIC GENIUS
3. REDI EXPERIMENTAL AND THERAPEUTIC DOCTOR

To distinguish the experimenter from the therapeutic doctor is advisable to define his ambition to renewal in experimentalism (refusing baroque oddities) that however had to surrender itself to the Hippocratic and Galenic principles in the therapeutic practices, because of external to science reasons.

4. REDI BETWEEN EXPERIMENTALISM AND TEXTUAL SOURCES

Redi achieved to combine his deep and vast learning with his true experimentalist ambitions, in a century during the which the \textit{auctoritates}’s followers and the scientists who wanted to erase the tradition (and to rely only to experimentation) were in contrast each other.
5. **REDI BETWEEN VISUAL PRINCIPLES AND UNCERTAINTIES**

The visual aspect of Redi’s epistemology and methodology was in line with the century and gave him observational and experimental certainties, but without making him surrendered to the temptation of absolute certainty. His uncertainty’s expressions were sincere, and beyond “diplomatic” prudence.

6. **REDI AND THE PHYSICAL-“CHEMICAL” INTERESTS**

The Redi’s researches in physics and chemistry ranged from theoretical to practical questions.

7. **REDI BIOLOGIST**

The biological studies are the most characterizing ones in Redi’s work. They range from anatomical dissections to animal dissections to studies on parasites, from experimentations on animal generation to observations on known animals to remarks on exotic ones. His observational studies on parasites and the experimental demonstration of non spontaneous generation are of historical weight.

8. **REDI AND VERNADSKJI**

Redi gets (epistemological, and not only historical) attentions still in the XIX-XX century. This demonstrates how much Redi’s theories (and relative implications) are still relevant. Vernadskji (1863-1945), that enunciates the “Redi’s Principle” and the “Dana’s Principle”, is a very good example.

9. **REDI AND THE CHOCOLATE**

In the 17th century, around the exotic novelty of chocolate broke into Europe, in Courts and rich society. Furious debates flared up between the advocates and opponents, involving political and ecclesiastical authorities. Redi was a tasteful aesthete and his interest in chocolate was neither theological nor medical.

10. **REDI AND A NEW WAY TO BUILD SCIENTIFIC TRUTH**

Redi gave a decisive contribution to change the way to build truth in biological field. The reassuring lay and theological *actoritates’* certainties were left. Scientists left perfect and guaranteed arguments of syllogism and deduction. They relied on the guide of research and of experimentation. Hierarchies and anthropocentrism were erased. The issue of these practices was knowledge, but more fragile. This was expressed by probabilistic sentences, and suggested change and perfectibility rather than absolute and eternal sentences.
**Today’s paper** will be drawn largely from the “number one” section (on Redi’s relations with the Medici court) of this larger work in progress, to define the social context of his scientific work and to begin to reflect upon how the study of the particular case of Redi may cast a broader and more nuanced light on the general character of early modern courtly science.

**Francesco Redi** (born in sixteen twenty six – died in sixteen ninety seven) spent most of his life, from the age of Twenty Five, as physician at the Medici Court, largely during the reign of Ferdinand the Second, a ruler well known for his interest in science, an interest Redi himself described as not merely ‘a vain and idle curiosity’ but one motivated by a commitment to ‘discovering the pure and naked truth of things’. Ferdinand’s patronage supported research in the fields of physics, biology, botany and zoology, the production of instruments and machines as well as the acquisition of materials for the naturalistic and botanical collections of Florence and Pisa. He also supported the publication of scientific work and assembled an impressive cast of scientific talent at his court, including besides Redi, Evangelista Torricelli, Vincenzo Viviani, Alessandro Marsili, Paolo And Candido del Buono, Antonio Uliva, Giovanni Alfonso Borelli as well as foreign scientists. Redi’s work was conducted within the general context of this courtly patronage, one which it is necessary to look at a little more closely.

I will first consider the character of Redi’s involvement in the life of the court, and then outline what seem to me to be the sphere of opportunity for scientific work opened to him by the courtly environment as well as some of the limits that it imposed upon his scientific activity.

Redi’s position as court physician meant that he could not sustain a wholly detached position from life of the court, but was often called to offer advice and opinions – medical, but also cultural and scientific – to his rulers (as in the case of the merits and dangers of chocolate). However, this did not mean that he was totally absorbed in the manners and habits of the court. This seems to be one of the arguments of Paula Findlen in her nineteen ninety three *History of Science* article ‘Controlling the Experiment: Rhetoric, Court Patronage and the Experimental Method of Francesco Redi’. Findlen argues that Redi ‘literally could not have existed with it [the court]’ and described Redi as ‘a courtier who deployed the natural and human resources that his environment offered to shape experimental narratives that met the expectations of a patrician and largely court-based audience,’ narratives that is with the primary function of offering ‘a sensory and theatrical spectacle’. While there is much important truth in this characterisation of Redi’s person and science, it is nevertheless equally important not to exaggerate the obviously ‘courtly’ characteristics.
of his science and to balance them with other factors in order to gain a full picture of Redi as a scientist as well as his cultural contribution and in the process point to the existence of other factors at work in the construction of early modern courtly science.

The example of Francesco Redi shows some of the other factors at work in the social context provided by courtly science. These factors include:

a) A GENUINE EPISTEMOLOGICAL DIMENSION. The epistemological context provided by ‘civil conversation’ in the courtly context that countered and perhaps even exceeded the demands of courtly spectacle, as in the case of Redi anatomical investigations which were conducted within a close circle of collaborators.

b) A CRITICAL POSITION ABOUT “MARVELS” AND A SCIENTIFIC CRITERION IN COLLECTING. Redi’s activities as a collector pursued a direction opposed to the broader ‘courtly taste’ for curiosities and marvels. If we look at his 1671 ‘Esperienze intorno a diverse cose naturali e particolarmente a quelle che si son portate dall’ Indie’ [Experiments/Observations concerning Various Natural Objects and Especially those that have been brought from India] we can see how the Medici collections guided by Redi distinguished themselves from other Italian collections by their commitment to experiment and classification. The difference is evident, with some nuances, in Redi’s attitude towards exotic ‘marvels’ brought back to Europe by sailors during the seventeenth century. His 1671 text should be situated within the context of the use of such material by Aristotelians to put in question the classificatory structures of Galilean science, a use analogous to that made of the discoveries of the microscopists (in particular Leeuwenhoek and Hooke) to defend the hypothesis of spontaneous generation. Redi pursued an oblique line to this approach by showing how a Galilean approach to the ‘marvels’ could guarantee the objectivity and systematicity of their classification. In his approach to the ‘marvels’ in his debate with Kirchner on the properties of special stones, Redi pursued an argumentative strategy that followed three stages: after showing the unreliability of deductions drawn from the marvels he proceeded to describe the object concluding with a demonstration of their scientific unreliability.

c) NO CONFORMITY TO ERUDITE LITERATURE MODELS. Another factor of considerable importance in appreciating the scope of Redi’s scientific work was his absence
of linguistic prejudices. In both written and spoken communications Redi was careful to remain close to the terminology and expressions of everyday life, preferring to communicate scientific results using Italian. In particular we must notice four things:  

A) Redi appreciated written communication as much as the spoken one.  

B) Redi appreciated both vernacular and language of literature: he studied vernacular and wrote important texts on it.  

C) Redi didn’t prefer classical languages (Grecian and Latin) to Italian or exotic languages: he knew and used Arabic, Persian and Turkish.  

D) Redi had no particular preferences for Hebrew or Semitic languages.

d) DISSOCIATION FROM THE 17TH CENTURY ENCICLOPAEDISM. It is also important to note Redi’s conscious taking of a distance from the emerging tendency towards encyclopaedism. The latter would prove a strong temptation to a scientist working within a context of the courtly display of knowledge, since it would permit indulgent displays of erudition. Redi, however, in spite of some initial hesitation, preferred to pursue a more selective and sectorial approach to the organisation and presentation of knowledge, revising taxonomies in the light of new demands and discoveries. On the whole, Redi preferred to take a ‘vertical’ approach to knowledge – looking at the explication of phenomena – as opposed to a horizontal approach which would privilege situating the phenomenon within the context of other phenomena, as was the case with the encyclopaedic organisation of scientific knowledge.

e) ATTENTION TO POPULAR KNOWLEDGE AND TO COMMON PEOPLE. Finally it is necessary to counter the picture of the courtier professionally dedicated to the display of erudition with Redi’s sensitivity to the scientific value of ‘popular knowledge’. Redi was happy to listen to and learn from expert informants such as hunters, gamekeepers, fishermen, cooks, riders… His thoughts on the venom of vipers, for example, were indebted to the knowledge and the demonstrations of a professional viper hunter Jacopo Sozzi who offered Redi demonstrations on the properties of snakes’ venom.

I would like to conclude with some reflections upon the opportunities opened by and the limits imposed upon the conduct of science within a courtly context as shown in the case of Francesco Redi. The court offered an environment distinct from the therapeutic and didactic contexts of hospital and university, one informed by the curiosity of patrons, a curiosity which it was the responsibility of the courtier scientist to nurture and to direct. The court offered hospitality,
financial resources as well as resources of power and prestige. Redi’s work was made possible by the former and benefited from the latter, his scientific work was supported by the reflected splendour of his courtly office and the overall prestige of the Medici court. In addition he also had access to the ‘human resources’ of the court in the persons of hunters, gamekeepers, painters, engravers, builders.

However, there were also undeniable limits placed upon the conduct of scientific work in a courtly context, exemplified by the case of Redi. Redi could not avoid direct request for his presence or his work, as shown by his work on chocolate. In addition, his office of court physician and its associated responsibility for the health of the ruler and the court placed severe limits on his time and his freedom to use it in the pursuit of scientific work, as shown by the frequent interruptions in his manuscripts as he is called away to fulfil courtly duties. The stability and continuity of scientific work was also disrupted by the seasonal mobility of the court, and perhaps less tangibly by the need to maintain prestige and position within the courtly environment. A final significant limiting factor was the limited possibility of working at first hand – pressure of time forced Redi to rely on the reports of others and also restricted his leisure to reflect on their significance.

However, in spite of these limits – which are not the obvious ones of the courtly display of erudition – I hope I have been able to show in a preliminary way that the image of courtly science in general and the figure of Francesco Redi in particular have to be considered in a more nuanced way that pays justice to the opportunities and limits presented to scientific work within the complex environment represented by the early modern court.