Before Montucla: Historiography of Science in the Early Modern Era. Workshop at the *Interdisciplinary Centre for Science and Technology Studies*, *Bergische Universität Wuppertal*, Germany, March 3/4, 2016

Abstracts (1/2016):

Robert **Goulding** (Notre Dame): *Ramus and the mathematics of the academy*

In his metaphysics, mathematics, and natural philosophy, Petrus Ramus considered himself to be an heir to Plato. He knew Plato's writings thoroughly, as well as the writings of the late-antique Athenian Neoplatonists. But Ramus's Plato had more in common with Socrates than he did with Proclus, which put him out of step with most Renaissance readers of Plato. To justify his reading of Plato, Ramus turned to the history of the Academy, and the supposed disagreements within the early Academy over the correct reading of their master's works. In this paper, I will examine Ramus's constructions of the history of the Platonic Academy, with particular attention to how he understood the role and development of mathematics in the Academy.

Antonella **Romano** (Paris): *What is "Chinese science"? A reading of the missionary reports and books (1550's-1650's)*

The aim of my paper is to investigate the description provided by European scientists of science outside Europe. It is part of a broader enquiry about the European making of non-European knowledge. Within this framework, my hypothesis is that one of the major sources of what we can today identify as "eurocentrism" lies in the various representations provided in the 16th and 17th centuries of knowledge production in the non-European zones. Faced with a highly developed and learned world, the first European who settled in China have also been the first providers of information about what they immediately recognized as sciences. Their precise description of such activities has not only deeply shaped European understanding of China (and more generally what was not European), but it has also been part of a crucial European debate whose major issue was the delineation of an unstable and contested frontier between science and faith.

H. Floris **Cohen** (Utrecht): *Half a dozen 17th century practitioners on the history of their craft*

I shall discuss, and then compare with each other, views expressed about the past of science/natural philosophy by six prominent, 17th century practitioners. These concern, in chronological order, Stevin's conception of what he called the Age of the Sages; Bacon's polemical analysis of the ancient-Greek pursuit of nature-knowledge; Kepler's evaluation of Ptolemy's achievement in astronomy and in musical theory; Pascal's ideas about the relationship between the ancient and the modern approach to nature-knowledge; Huygens' musings upon reading Baillet's biography of Descartes, and Newton's views on the Pythagorean origin of the law of universal gravitation. To be sure, none of the texts in question are unknown as such; each has been analysed by one or more specialists, yet a comparison between them may contribute something useful to the workshop theme.

Niccolò **Guicciardini** (Bergamo): *Isaac Newton's views on the historical development of mathematics*

Isaac Newton was not only a first-magnitude "geometer" and "natural philosopher," but also an accomplished "divine" and "historian." In his maturity (and may be even earlier), he got involved in an erudite study of the history of the early Church. Further, especially after his move to London in 1696, he displayed his double competences in astronomy and history as a writer on chronology. In recent years, great attention has been devoted to Newton as a scholar intent on bookish researches guided by humanistic expertise in the fields of the history of the early civilizations and of pagan and Christian religion.

However, Newton did not write systematically on the historical development of mathematics, an interest that, to make a pertinent example, characterizes the work of his contemporary John Wallis. Moreover, in his mathematical works Newton seldom displayed humanistic hermeneutic techniques, such as common-placing and collation of excerpts; techniques that characterize his alchemical, religious and chronological writings.[1] Nor did Newton devote himself to editions of Greek (and Arabic) mathematical works, as Isaac Barrow did in the 1650s, and later Wallis, Edward Bernard, David Gregory and Edmond Halley in Oxford, Robert Simson and Matthew Stewart in Scotland.

[1] Exceptions might be a few youthful manuscripts such as the mathematical entries of the *Questiones* (C.U.L. Add. 3996, edited by McGuire and Tamny) and *On Quantity and Muchness* (C.U.L. Add. 3995, unpublished).

Thus, *prima facie*, little of Newton's scholarly expertise as a historian is discernible in his mathematical work. Three notable exceptions can elicit our interest in the context of this workshop.

(i) Newton's manuscript writings on the lost works of the ancient geometers (such as Euclid and Apollonius) which were an inspiration for Gregory and Halley in their editions;

(ii) Newton's rumination on the ancient mathematicians (Pythagoras *in primis*) in the so-called Classical Scholia and related writings devoted to the *prisca*;

(iii) Newton's textual and historical research regarding the polemic with Leibniz, when, in order to secure his priority in the invention of the calculus, he produced (in co-operation with acolytes such as John Keill and Joseph Raphson) a forensic account of an "exchange of letters" mostly with Collins and Wallis concerning the "birth of analysis" (the *Commercium epistolicum* (1713/1722)), and a "history of fluxions," as Raphson's title (1715/1717) runs, based on "authentic documents."

These sources allow us to attempt a narrative of Newton's changing views on the historical development of mathematics.

Daniel **Špelda** (Brno): *The history of science as the progress of civilization: Historiography of astronomy in the 18th century*

In my contribution, I want to analyse early histories of astronomy which began to appear during the 18th century, such as Cassini's *De l'origine et du progrès de l'astronomie* (1699), Weidler's *De ortu et progressu astronomiae* (1741), Heilbronner's *Historia matheseos* (1741), Estève's *Histoire de l'astronomie* (1755), Montucla's *Histoire des mathématiques* (1758), Costard's *The History of Astronomy* (1764), and Bailly's *Histoire de l'astronomie ancienne* (1781). I want to focus on several specific questions arising after reading of these works. How did the historians and astronomers evaluate the historical importance of ancient astronomy? How did they imagine the origins of astronomy? How did they assess the persuasiveness of ancient heliocentrism (e.g. Pythagoreans, Aristarchus)? Did they think that the history of astronomy ran in cycles of success and decline, or did they assume the existence of continual linear progress in astronomical knowledge? Did they depict the history of astronomy from the "externalist" or "internalist" perspective? How did they evaluate the importance of astronomy for the development of civilization? Did they connect

the history of astronomy with the general idea of progress of mankind as it was developed by other thinkers of the Enlightenment? What was the category that enabled the historians of astronomy to connect the development of astronomy with the progressive history of mankind? The answers of the early historians of astronomy to these questions will be commented upon by looking to the philosophical, anthropological, economical, and cultural ideals of the Enlightenment. The goal of my paper is to present systematically basic ideas dominating discourse on the history of astronomy during the Enlightenment.

Tobias **Winnerling** (Düsseldorf): *Crafting one's self into knowledge. Caspar Burman produces savants in 18th century Utrecht*

The memory of the scientific community was a contested ground in the beginning of the 18th century where actors competed to establish traditions, disciplines, lineages, and fame to further and perpetuate their own positions. As such, it could be used as a power tool with long-lasting effects, creating and transforming the history of science along with science itself in the process of its making and reception.

In the 1730s, Kasper Burman (1696–1755), born into a family with a long learned and professorial tradition in Utrecht, wrote *Trajectum Eruditum*,[2] a compendium of those men who according to him had been Utrecht's paragons of science up to his days. Of his own lineage that included his father, grandfather, brother, and other relations besides friends of the family.

The work was explicitly aimed at memory construction, to remember those whose achievements should not be forgotten. Ironically the reason put forward for this was the claim that their scientific merits were to be considered eternal and immortal. In trying to establish these claims through his book Burman implicitly acknowledged that the scientific achievements which should by themselves grant everlasting fame to their holders only could do so as long as they were discursively constructed, disseminated, and remembered.

The process of perpetuation of memory that Burman intended to serve by his writings was useful for other ends as well. Not only could he try to secure his own position in the scientific community of his day by portraying himself as the heir to a famous learned lineage, he also

[2] Burman, Kasper: *Traiectum Eruditum Virorum Doctrina lnlustrium, Qui ln Urbe Trajecto, Et Regione Trajectensi Nati Sunt, Sive lbi Habitarunt, Vitas, Fata Et Scripta Exhibens*, Utrecht: Paddenburg 1738.

tried to bolster the reputation of his institution – Utrecht University – in its struggle with Leiden which university should be ranked first in Dutch academia. At least in establishing the reputation of those he portrayed Burman was fairly successful. Up to this day the core of information handed down about the learned community of 18th century Utrecht is based on his work – other Dutch universities of the time are less well documented, and therefore information about their staff less broad. About scientists in Leiden (where no one produced such a collection) we are comparatively less well informed. What Burman achieved was not only the preservation of memory but the shaping of a strand of the history of science of its own, and prolonged influence on the development of the history of 18th century Dutch scientists.

Laurens **Schlicht** (Frankfurt/M.): *The history of the sciences and the sciences of man (France, ca. 1773-1804)*

In my paper I will investigate how several empirical projects of the sciences of man around 1800 used the history of the sciences (*histoire des sciences*, both in a narrower and a wider sense) to interpret findings of concrete observation of the history of the human mind. In France and also in German-speaking areas the second half of the 18th century was characterized by the emergence of the project of a unified and empirical science of man. For the actors discussed one marker of being human was the ability to generate scientific interpretations of himself and the outside world, i. e. of the realm of society and of nature. Insofar science itself became a marker of being human.

Aside from its role as an emerging genre of texts, the history of the sciences had thus a functional role to interpret the place of individuals or groups of human beings on a scale of the progresses of the human mind. It is exactly this functional role of the *histoire des sciences* that will form the focus of my attention. At the onset of the discussions about empirical sciences of man in society this functional role will be elucidated by an analysis of Condorcet's contribution to the history of the sciences, which he thought to be part of schemes of the history of the human mind. In a second step I will focus on the activities of a learned society called the *Society of the Observers of Man* (1799-1804), that tried to implement theoretical considerations about the sciences of man in concrete research activities. This empirical science of the history of the human mind included, as will be shown,

the history of the sciences as a tool to justify interpretations about the progress of the human mind.

Bart **Karstens** (Amsterdam): *The history of science as a quest for moral perfection*

Joseph Priestley (1733-1804) was a man of many talents. He was a leading investigator in electricity and chemistry. Next to this he was a (radical) political theorist and theologian. He supported his views on politics, religion and science with historical arguments. His views on history thus formed an important part of his thinking. The way he approached the subject made him a pioneer in modern historiography, and also turned him into a public intellectual.
In considering Priestley's historical views we must distinguish between his secular and religious writings. When it comes to his secular historiography Priestley showed himself as a child of the Enlightenment. Reason is the most important theme and his worldview is mechanical. For Priestley history revealed God's workings in the world. References to diverse historical contexts had no other goal than to demonstrate timeless concepts and principles, which he saw as an expression of divine perfection. Progress of humankind is given by its development towards these timeless concepts and principles. Thus the identification of common factors in human experience always had the upper hand; the larger scheme was more important than individual periods. In his secular historiography there is not much attention to change or the 'flow' of history. Historical study is also not considered as valuable in itself, as it could be from a Romanticist perspective.
Priestley's religious historiography was however different. He opposed two other major historians, Gibbon and Hume, who both considered Christianity (or even all religion) as a negative historical factor. For Priestley however, Christianity was fundamentally good. The troubles with it came from the fact that faith had been seriously corrupted. He defended the ideas of Unitarianism. Thus, he did not accept dogmas such as original sin, the holy trinity, the virgin birth, the divinity of Christ and transubstantiation. Christ was seen as a human being, whose life had been an expression of a simple humanity and an embodiment of the highest moral virtues, and this provided the prime example for the moral conduct of Christians. His *An History of the Corruptions of Christianity* (1782) aimed to demonstrate how the corruption of faith had come about and provide arguments for what he saw as the pristine form of Christian religion. His approach can be called truly historical. He carefully studied the alterations in thought and meaning of words in relation to religious concepts and

changing circumstances, with an eye to the reality and diversity of human experience. This work was accompanied with a plea for using primary sources in historical research, not just original texts but also material objects like coins. There are no linear concepts or mechanisms in Priestley's religious historiography; instead there is much attention to historical change. Perhaps paradoxically Priestley used the contextual to validate the eternal. There once had been a period in which religion had been uncorrupted and since then this continued to serve as a model of moral conduct and purity of faith.

Priestley's Unitarian views can be placed in a tradition of so-called 'rational dissent', which also includes Isaac Newton. Priestley's strived to connect rationalism, materialism, determinism and religion. His holism is strikingly present in all topics he discusses, whether it is the unity of God, man and nature, the interrelation of all factors in a historical context, the interrelation of all historical periods, or the idea that every natural fact is related to all other natural facts. Hence in his mind the study of nature leads us to knowledge of God's will. Natural laws are the expression of divine perfection and learning to discover these laws is a matter of approaching this perfection. Priestley's theory of learning was derived from the associationism of Locke and Hartley. We learn through improving our associations. Historical knowledge had an essential role to play in achieving such progress. Making use of the deeds, experiences and achievements of our predecessors helps us to move towards glorification in the future. Priestley thought about the history of science as a crop to harvest or a storehouse to obtain products. It offered a general overview of all branches of natural investigation, it offered inspiration, it led to the eradication of prejudice and it instilled us with a capacity for good judgement. It is very important to realize that most of these benefits had a strong moral component. Practicing natural philosophy for Priestley was the way to stay on the course to moral perfection and keep faith uncorrupted. Priestley firmly believed that if man strove for moral perfection through the study of nature, much evil and immorality would disappear. His work is marked by optimism about educational and moral progress. The study of history embodies this, as well as strengthens its future development. Thus, for Priestley there was no essential difference between history of science and present-day science, hence the combination of 'history' and 'present state' in the titles of his most important works on the history of science: *The History and Present State of Electricity* (1767) and *The History and Present state of Discoveries related to Vision, Light and Colours* (1772). If scientific knowledge is the engine of social progress and moral reform, it should not be kept

secret. For this reason he argued that women should be educated as well as men. Priestley wrote popularizing books to encourage as many people as possible to participate in acquiring scientific knowledge. Through the success of these books he manifested himself as a public intellectual.

The fact that no fully coherent picture of Priestley's historical views emerges marks him as a transition figure in historical thought between the Enlightenment and Romanticism. That he was an important figure in this respect can be seen through the parallels than can be drawn between his work and that of *positivist* scholars from the early 20th century, whose ideas have left a clear mark on professional historiography of science. Thus, in George Sarton we also find the idea of history as a guardian of tradition, the stress on the moral virtues of the scientific endeavour, science as the highest achievement of humankind, the notion of a continuum between science and the history of science and the idea that historians of science had to be specialists in generalization. While his 'New Humanism' was stripped from religion, it nonetheless still contained much of the moral zeal we also find in Priestley. Another parallel can be drawn to Ernst Mach and his associationist theory of learning. While Mach placed this in the context of Darwinian evolution and while there are clear differences between Mach and Priestley on how to tell whether associations amounted to real knowledge or were just mere opinion, the core ideas of theory formation through association and progress through improving on association relations, as well as the optimism about this progress, are essentially the same.