Germano Maifreda

READING *IL CAFFÈ*: SCIENTIFIC METHOD AND ECONOMIC KNOWLEDGE IN THE "SCHOOL OF MILAN"*

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ABSTRACT: *This paper takes into consideration the contents of the main journal produced by the so-called School of Milan, one of the main centers of irradiation of the Italian Enlightenment and among the most important intellectual circles in Eighteenth-century Europe. The essay analyzes, in particular, the reception of new scientific methodologies by the Milanese illuminists (including Pietro Verri and Cesare Beccaria), as well as their application to the renewal of coeval economic knowledge. The main conclusion is that the School of Milan had a critical and, in a way, disenchanted view of seventeenth- and eighteenth-centuries scientific innovation; and precociously learned to grasp the limits of mathematics applied to the social sciences.*

KEYWORDS: *Enlightenment, Milan (History), Pietro Verri, Cesare Beccaria, «Il Caffè» (journal), Economics, Science (Sistory).*

METODO SCIENTIFICO E CONOSCENZA ECONOMICA NELLA "SCUOLA DI MILANO": LETTURE DA "IL CAFFÈ"

SOMMARIO: *Questo articolo passa in rassegna alcuni contenuti della principale rivista prodotta dalla cosiddetta Scuola di Milano; uno dei principali centri di produzione e irradiazione intellettuale illuminista italiana e fra i maggiori nell'Europa settecentesca. Il saggio analizza, in particolare, la ricezione delle nuove metodologie scientifiche da parte degli intellettuali illuministi milanesi (tra cui Pietro Verri e Cesare Beccaria), e la loro applicazione al rinnovamento della conoscenza economica coeva. La principale conclusione è che la Scuola di Milano ebbe una visione critica e disincantata della nuova scienza sei-settecentesca, e seppe precocemente cogliere i limiti della matematizzazione applicata alle scienze sociali.*

PAROLE CHIAVE: *Illuminismo, Milano (Storia), Pietro Verri, Cesare Beccaria, "IL Caffè" (periodico), Economia, Scienza (Storia).*

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Abbreviations: Franzoni, G., Romagnoli, S. (eds), *«Il Caffè»: 1764-1766*, 2 vols, Turin, Bollati Boringhieri, 1998² (hereafter FR, followed by volume number).

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1. The Lombard Enlightenment and Scientific Method

One of the chief areas of interest for international scholars of the history of economic culture today is that of the relationship between the evolution of economic learning and the development of modern scientific inquiry in Europe between the 16th and 18th centuries. In this context studies regarding the scientific, methodological, aspects of the economic ideas originating in Lombardy during the second half of the 18th century, as well as their practical application in reforms enacted by Maria Theresa and Joseph have – unlike the Neapolitan Enlightenment[1] – as yet been only superficially studied. Yet material as important and vivid as the correspondence between Pietro Verri (1728-97), known as the establisher of the "School of Milan", as Voltaire called it[2], and his brother Alessandro, is full of far from academic references to the great fathers of the European scientific revolution.

In October of 1766, Pietro Verri's first letter from Milan to his brother and Cesare Beccaria, who were on their way to Paris and London, remarked of the hours spent with Luigi Stefano Lambertenghi: «He comes of an evening with his little Bacon to read in my room, while I pore over Alessandro's work with a sense of consolation»[3]. Indeed, the Lord Chancellor remained one of the favorite authors of the group which called itself *Accademia dei Pugni* ['The Punching Academy'] and, in particular, a favorite of Beccaria's (1738-1794), the main follower of Verry and, by far, the best known name of the Italian economic school of the time. He had copied out a number of passages for his own use in about 1762[4]. Alessandro's letters are studded with

[1] See for example R. Ajello, *Introduzione. Cartesianismo e cultura oltremontana al tempo dell'«Istoria civile»*, in R. Ajello (ed.), *Pietro Giannone e il suo tempo: Atti del convegno di studi nel tricentenario della nascita*, Naples, Jovene, 1980, vol. 1, pp. 1-181; G. Galasso, *Scienze, istituzioni e attrezzature scientifiche nella Napoli del Settecento*, in R. Ajello (ed.), *L'Età dei lumi: Studi storici sul Settecento europeo in onore di Franco Venturi*, Naples, Jovene, 1985, vol. 1, pp. 191-228. J. Robertson, *The Case for the Enlightenment: Scotland and Naples 1680-1760*, Cambridge, Cambridge University Press, 2005.

[2] P.L. Porta, *Italy*, in V. Barnett (ed.), *Routledge Handbook of the History of Global Economic Thought*, London-New York, Routledge, 2015, pp. 58-67, p. 63.

[3] G. Gaspari, *Viaggio a Parigi e Londra (1766-1767): Carteggio di Pietro e Alessandro Verri*. Milan, Adelphi, 1980, p. 4. See *ibid.*, as well, the letter written two days later (p. 10): «Dear Luisino regularly comes to pass the evening with me: he reads his Bacon, I correct the *Storia* [of Milan]». On Lambertenghi and his scientific/mathematic interests, praised by Pietro Verri in letters to Gian Rinaldo Carli, see C. Capra, *Luigi Stefano Lambertenghi*, in *Dizionario biografico degli italiani*, vol. 63, Rome, Edizioni dell'Enciclopedia italiana, 2004.

[4] G. Gaspari, *Viaggio a Parigi e Londra*, cit., editor's note. Beccaria's reputation is almost entirely due to the pamplhlet *Dei delitti e delle pene*; he is therefore not perceived as an economist, although he is one of the first professors of Political Economy worldwide. See C. Scognamiglio Pasini, *L'arte della ricchezza. Cesare Beccaria economista*, Milan, Mondadori, 2014.

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admiring references to Newton's work as well as to the simple, direct, communicative style of figures like Diderot, d'Alembert and d'Holbach; an attitude and tone British scientific circles had already made emblematic of their intellectual production in the 17th century.

Let me say a few words about these people. The character which they require of Men is first of all goodness, rather than science. Their tone is familiar, philanthropic. There is nothing of the magniloquent; there is no pedantry; they discuss among themselves with fervor and rigor, with all the good faith in the world[5].

The Accademia dei Pugni and its periodical *Il Caffè* ('The Coffee House') both belonged to a very intense period that saw the birth of several masterpices of the Italian Enlightenment: Pietro Verri's *Meditazioni sulla felicità* ('Meditations on Happiness', ca. 1763) and, above all, Beccaria's *Dei delitti e delle pene* (1764, 'An Essay on Crimes and Punishments') made the "School of Milan" one of the true centers for cosmopolitan dialogue[6]. The international relevance and originality of the economic knowledge developed in eighteenth-century Lombardy is undisputable, and was clearly perceived by contemporaries. One of the few obituaries published in the death of Adam Smith in July 1790, which appeared in the *Times* and then reprinted on the *Gentleman's Magazine* stated that Smith had drawn attention to «subjects that unfortunately have become too popular in most countries of Europe. Dr Smith's system of political oeconomy is not essentially different from that of Count Verri, Dean Tucker, and Mr Hume»[7].

[5] G. Gaspari, *Viaggio a Parigi e Londra*, cit., p. 24, Paris, October 19, 1766. From the mid 17th century the Royal Society required of its members, as an internal memorandum of the period declares, «a discrete mode of speaking, simple, natural, clear in meaning, preference for the language of craftsmen and merchants rather than that of philosophers»: see P. Rossi, *Il tempo dei maghi. Rinascimento e modernità*, Milan, Cortina, p. 7.

[6] *Italy*, in M. Delon (ed.), *Encyclopedia of the Enlightenment*, London-New York, Routledge, 2001, p. 724.

[7] Quoted in E. Rothschild, *Economic Sentiments: Adam Smith, Condorcet and the Enlightenment,* Cambridge Mass, Harvard University Press, 2002[2]. On Verri's economic thought see initially P.D. Groenewegen (ed.), *Pietro Verri 1771: Reflections on Political Economy*, Sydney, University of Sydney, Reprints of Economic Classics (now reprinted New York, Augustus M. Kelley, 1993); P.D. Groenewegen, *Pietro Verri's Mature Political Economy of the* Meditazioni, in M. Albertone, A. Masoero (eds), *Political Economy and National Realities*, Turin, Fondazione Einaudi, 1994, pp. 107-125; P.D. Groenewegen, *The Significance of Verri's* Meditazioni *in the History of Economic Thought: The Wider European Influence*, in C. Capra (ed.), *Pietro Verri e il suo tempo,* Milano, Cisalpino, vol. 2, pp. 693-708; C. Capra, *I progressi della ragione. Vita di Pietro Verri*, Bologna, Il Mulino, 2002; P. Barucci, *Gli Scritti di economia nella edizione nazionale delle* Opere *di Pietro Verri*, «Nuova Antologia», 2008, n. 2247, pp. 157-69.

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The relations between economic knowledge and mathematics were – as Tubaro has opportunely noted – characterized by a decided originality[8]. Attempts to formalize economic argumentation were very precocious – Giovanni Ceva's fundamental *De re numeraria* was printed in Mantua in 1711 – and, indeed, appeared much earlier than in France, where reference to exact science within economic studies was often more a declaration of principle than a rigorous and methodologically accurate procedure. Still in 1771, in his first writing on political economy contained in letters written to Pietro Verri, an innovative mathematician such as Condorcet expressed all his skepticism about the deluded use of «the language of geometry» in the «economic sciences»; a use that he discerned in the Lombard scholarship[9].

Giovanni Ceva, a mathematician expert in hydraulic engineering, as well as a public official, created an algorithm which aimed at representing an economic system through two fundamental variables – population and the quantity of money in circulation – whose interaction would, in his opinion, determine the buying power of the coinage. While, from a theoretic-monetary point of view, Ceva's argumentation added no significant qualitative knowledge to prior elaborations (and his mathematics were, in reality, limited to simple arithmetic operations like fractions and proportions), his methodological innovation consisted chiefly in the attempt to analyze monetary questions geometrically, dealing with them in precise, univocal, language and with rigorous logic.

The problem of the relations between the proportions of the metals involved and the quantification of monetary circulation had in any case already been explored since the Middle Ages and, in the Early Modern period, had become the object of rigorous analyses by Coper-

[8] See P. Tubaro, *Un'esperienza peculiare del Settecento italiano: la «scuola milanese» di economia matematica*, in «Studi settecenteschi», 2000, n. 20, pp. 193-223. On the general aspects of the Political Economy elaborated by the «Milanese School» see A. Quadrio Curzio (ed.), *Alle origini del pensiero economico in Italia: il paradigma lombardo tra i secoli XVIII e XIX*, Bologna, Mulino, 1996; P.L. Porta, R. Scazzieri, *Pietro Verri's Political Economy: Commercial Society, Civil Society, and the Science of the Legislator*', «History of Political Economy», 2002, n. 1, pp. 83-110; L. Bruni, P.L. Porta, Economia civile *and* pubblica felicita *in the Italian Enlightenment*, in N. De Marchi, M. Schabas (eds), *Œconomies in the Age of Newton*, Annual Supplement of «History of Political Economy», 2003, n. 34, pp. 261-86; L. Bruni, S. Zamagni, *Civil Economy. Efficiency, Equity, Public Happiness*, Oxford, Peter Lang, 2007; P.L. Porta, *Lombard Enlightenment and Classical Political Economy*, text of the Blanqui Lecture *The School of Milan: Competition and Public Happiness in Pietro Verri's Political Economy* delivered at the XIII Eshet Annual Conference, Thessaloniki, 23 April 2009, available on http://www.eshet.net.

[9] Quoted in E. Rothschild, *Economic Sentiments*, cit.

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nicus, Scaruffi and Montanari[10]. It should also be noted that Ceva's work was not intended to have explicitly methodological ends, constituting, rather, a group of precepts to aid the «Prince» (who remained the chief actor in the economic system) in the wielding of power; the scientist's analysis was to serve principally as general orientation, to adopt for useful and discretionary legislative regulations. For these reasons, too (and the choice of Latin for the printed text is a clear corroboration), Ceva's brief study had a distinctly limited circulation and exercised no direct influence on successive economic thought.

The passages in Cesare Beccaria's work where we find mathematic methods applied to economic discussions have a deeper historic and epistemological weight. In 1762, Beccaria wrote *Del disordine e de' rimedi delle monete nello Stato di Milano* ('Monetary Disorder and Its Remedies in the State of Milan'), revealing the mathematic talents of the author – whom fellow students at Parma's Collegio dei Nobili had significantly nick-named Boy Newton («Newtoncino»). The first section of this study presented three fundamental theorems on the value of coins and some corollaries in political economy. The second part introduced an empiric study of the Lombard case based on data from a study by Gian Rinaldo Carli[11]. As we know, Beccaria made some numeric-monetary errors here in considering the dimensions proposed and this skewed his conclusions, drawing a number of criticisms. Further, in *Il Caffè* Beccaria represented the problem of contraband with a mathematic model (*Tentativo analitico dei contrabbandi*, 1764), advancing, however – as we shall see better – numerous and opportune doubts. The lessons he held at the Scuole Palatine (published posthumously in *Elementi di economia pubblica*, 1804), clearly show Beccaria's limits – and his caution – in using "geometric demonstrations", including, indeed, the fleeting annotation: «It is not possible to fix the intrinsic value of human labor with arithmetic precision…»[12].

[10] See G. Maifreda, *From* Oikonomia *to Political Economy: Constructing Economic Knowledge from the Renaissance to the Scientific Revolution.* Farnham Uk-Burlington Vt, Ashgate, 2012. Marco Bianchini has acutely written that Ceva's audacity consists chiefly in «discovering an area in which all men are equal and may be represented by a combination of goods and coin which, in turn, are linked in a network of functional relationships wholly analogous to those of the physical universe» (M. Bianchini, *Alle origini della scienza economica. Felicità pubblica e matematica sociale negli economisti italiani del Settecento*, Parma, Studium Parmense, 1982 197). See also M. Bianchini, *Some Fundamental Aspects of the Italian Eighteenth Century Economic Thought*, in D.A. Walker (ed.), *Perspectives on the History of Economic Thought*, Aldershot, Elgar, 1989, pp. 53-67.

[11] For an evaluation of Carli's monetary intuitions, A. Cova, *Pietro Verri e la riforma monetaria*, in C. Capra (ed.), *Pietro Verri e il suo tempo*, vol. 1. Bologna, Cisalpino, 1989, pp. 763-88.

[12] P. Tubaro, *Un'esperienza peculiare del Settecento italiano*, cit., p. 202.

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The exponent of the Milan School most engaged in formalizing economic discourse was the Barnabite Father Paolo Frisi, the first person in the history of the field to apply differential and integral calculus – not without provoking heated criticism from his contemporaries and giving rise to a harsh methodological dispute. Mathematician, astronomer – and, once again, a hydraulic engineer – Frisi took the mathematicized mechanics perfected by Newton as his frame of reference, completing the so-called 'sixth edition' of Pietro Verri's *Meditazioni* in language strongly influenced by physics.

The mindset of physics represented an overall filter through which Frisi read the economic system as a whole, even in scientifically less qualified material than Verri's celebrated tract. The Milanese economists were directly involved with the design and practical implementation of the Theresian Reforms in the territories of the Austrian Lombardy. In this way, the 'public' dimension became more prominent and intertwined with the practical needs for reforms and the utilitarian language more explicit and richer[13]. On the occasion of the death of Maria Theresa of Austria, Frisi's *Elogio a Maria Teresa imperatrice* (1781), listed among the most important fundamental principles characterizing her enlightened government the recognition of the fact – which he felt to be indisputable – that «full and reciprocal competition and conflict always increases the industry and wealth of bodies politic, as it increases the mobility of elastic bodies»[14]. In the same essay, Frisi cites the famous Law of Prices postulated by Verri (whose view of Frisi and the theories he formalized in his *Meditazioni* was not, in any case, wholly positive), view which he had made explicit in a very sophisticated manner given the culture of the century, which only in its last decades saw differential calculus receive an overall theoretical formulation[15].

Frisi's mechanical-mathematic recasting of Verri was famously deplored by Luigi Einaudi, who judged it a damaging blurring of the originality of Verri's thought[16]. The fact that this project was already strongly criticized in the late 1700s allows us a glimpse into the

[13] P.L. Porta, *Italy*, cit., p. 63.

[14] P. Tubaro, *Un'esperienza peculiare del Settecento italiano*, cit., pp. 202-3.

[15] It should be recalled that already in 1748 Gaetana Maria Agnesi published in Milan her *Intuizioni analitiche*, in the same year in which Euler printed his *Introductio in analysin infinitorum*: see F. Minozio, *Chiarezza e metodo: L'indagine scientifica di Maria Gaetana Agnesi*, Como: New Press, 2006.

[16] On the «illuministic friendship» between Frisi and Verri see G. Barbarisi, *Frisi e Verri: storia di un'amicizia illuministica*, in G. Barbarisi (ed.), *Ideologia e scienza nell'opera di Paolo Frisi (1728-1784): Atti del Convegno internazionale di studi*, Milan, FrancoAngeli, 1987, vol. 2, pp. 353-379 and C. Capra, *Nota introduttiva*, in C. Capra (ed.), *Per Paolo Frisi: Lettere e memorie (1782-1787). Edizione nazionale delle opere di Pietro Verri*, vol. 6, *Scritti politici della maturità,* Rome, Edizioni di Storia e letteratura, 2010, pp. 145-54.

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general cultural climate within enlightened debate, and not only in Lombardy. It testifies the presence of a significant skepticism as to the heuristic reach of geometrization of the social sciences. In 1772, when the so-called 'sixth edition' was published, Ignazio Radicati di Cocconato already advanced a number of basic criticisms, writing to Frisi in March of that year to express his disappointment and fears for the future: «they will make of political economy what the Scholastics made of philosophy». The important reservations of the Tuscan mathematician, Pietro Ferroni, followed in 1796.

A particularly outraged analysis was contained in an anonymous *pamphlet* entitled *Meditazioni sull'economia stercoraria*, which Franco Venturi has shown to be the work of Carli, probably offended by Verri's failure to mention his earlier criticism in the new edition of his work. The *Meditazioni* parodied the «excremental economy», following a pattern of argumentation already visible elsewhere – for example in the letters exchanged by the Genoese Pietro Paolo Celesia and Ferdinando Galiani in December, 1772[17].

The uneven response accorded to the mathematization of economic knowledge proposed by the Milanese Barnabite, Frisi, is worth a brief widening of our perspective and a few further elements to fill out the picture may be useful premises for some more specific considerations I shall develop in the second part of this paper concerning ways in which the figures of the Lombard Enlightenment dealt with the theme of scientific method in relation to economics and the other social sciences.

As Pier Luigi Porta has observed, one of the distinctive traits of the Lombard Enlightenment project for the elaboration of a new economic science is its reforming intent and the will it embodies to break open the tradition of the public administrator with a wholly legal formation in favor of a broadly economic figure with special, scientific, characteristics. This was especially the case after the creation on November 20, 1765, of the Supreme Royal Council on Public Economy (Supremo Reale Consiglio di Pubblica Economia), presided by Gian Rinaldo Calvi, Verri's antagonist as well as one of the most important economists in the Milan of the time[18]. Verri's own economic thought – which constituted the prime expression of that great political and cultural moment – went from *Elementi di commercio* (whose first version dates from 1760), to the last of the *Discorsi* entitled *Sull'indole del piacere e del dolore* ['On the Disposition of Pleasure and of Pain'] (1773): a work in which he once again took on themes of major scientific import, ar-

[17] P. Tubaro, *Un'esperienza peculiare del Settecento italiano*, cit., p. 203.
[18] Bognetti, Moioli, Porta, Tonelli 2006, 1-91.

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ticulating an anthropology based on two principles – pain as a mechanical, automatic, element and freedom as a moral reality – which he felt to be his most original theoretic contribution. Here, indeed, Verri, wavering between the physical/environmental and the moral explanations of anthropic characteristics, firmly excluded a third solution – advanced, among others, by both Hume and Voltaire[19] – which explained the variety of individuals composing the human species by citing 'racial' factors («being domiciled a few degrees closer to the poles, or to the equator», Verri observed tersely, «does not create a diversity in the species»).

Verri's experience is fully expressive of a period and an intellectual current which saw in political economy the true «human science» on whose bases, with more robust and general concepts and ideas, the project of reform might be undertaken and the search for «public felicity» find resolution. Franco Venturi noted some years ago that Pietro was moved by «enthusiasm at the discovery of political economy, key [for him] to all reforming action», together with «his growing conviction that he found himself in the presence of a genuine science»[20]. Among the ideal origins of this project were also, among many others, the Locke of *Some Considerations on the Consequences of Lowering the Interest and Raising the Value of Money*[21] – especially for its definition of money as «universal commodity» (*merce universale* [Verri] or *una generale mercanzia* as the Italian edition had put it), as well as the principle of price determination through the number of buyers and sellers (Hotta 1999). And the academic members of 'I Pugni' discussed Locke in the pages of *Il Caffè* as well, with, as we shall see, results that were not always predictable.

If, in any case, as Paola Tubaro has observed, the quintessence of 18th century political economy, even when compared to the earlier political arithmetic *à la* Petty, consisted in the crucial movement from quantification to formalization, since «the new science is intrinsically

[19] Imbruglia 1999, 466.

[20] Venturi 1998, 557.

[21] The economic writings, a number of papers – of which the leading title indicated here is a letter to a member of Parliament – were composed by Locke during his term as Secretary of the Board of Trade and Plantations as well as Secretary of the Lord Proprietors of the Carolines for Lord Ashley (Shaftesbury). Though the first Italian translation is usually ascribed to the Neapolitan Galiani, whose own book *Della moneta* was published in 1751 when its author was twenty, Stapelbroek 2005 affirms that the first Italian publication, edited by G.F. Pagnini and A. Tavanti, came out in Florence in 1751, with various annotations and «remarks concerning a proper evaluation of the things and the coinage and the commerce of the Romans». Galiani declares that he abandoned Locke in the '40s as he found himself in growing disagreement with the opinions expressed.

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mathematical, though not necessarily numerical» (a characteristic from which coherently proceeds «the refusal of the phenomenological data, the need to highlight the functional relations hidden among the various components of reality»[22]) – then I think we need to examine more closely the possibility of including Verri's economic production (and, more broadly, the ideas regarding scientific method applied to the social sciences formulated by the participants in the Lombard Enlightenment), under this heading. Let me then take a few pages to open up this line of thought.

The bibliography regarding Verri has introduced some important elements of complexity into the apparently compact methodological structure within which Verri formulated his economic theory. Already in the *Meditazioni*, where the basic goal of happiness (*felicità pubblica*[23]) is presented as an algebraic formula in the reduction of the relationship between the terms of desire and possibility, and where, as a staunch utilitarian, Verri leans towards *addition* in the form of an enlargement of the possibilities offered to mankind, the propensity to take advantage of one of the concepts destined to become essential to his political economy – that is, the *creativity* whose existence is the indispensable condition for the passage from the merely passive possession of things to the enjoyment of full-bodied happiness – has been remarked. «The excess of needs beyond […] power [to assuage them] is the measure of man's unhappiness, and it is no less the unhappiness of a State», he would later write in his *Economia politica*.

So the mere enjoyment of goods is distinguished from their desirable creative enjoyment, that is, the pleasure of doing and making with all the elements open to human possibility. From this premise comes, on the one hand, Verri's analysis of *virtù*, defined as every useful act and thus a term/concept with an active meaning; on the other, an anthropology which focuses on the *possibility* of activating, with adequate stimuli, the personal, human, resources producing creativity. Even in Verri's most important economic essay, the *Meditazioni*, the insistence on the theme of creativity as the fountainhead and origin of the formation of wealth – and so a proper object of political economy – is evident[24].

An immediate indication, with strong methodological consequences, of the role Verri assigns to ideal and practical creativity in the development of economic discourse may be seen in the process integrating the principle of «automatic mechanisms» into the theory and policy of

[22] P. Tubaro, *Un'esperienza peculiare del Settecento italiano*, cit., p. 194.

[23] The notion of *public happiness* best conveys the significance of the contribution of the Milanese School (see P.L. Porta, *Italy*, cit.).

[24] P. Tubaro, *Un'esperienza peculiare del Settecento italiano*, cit., pp. 47-8.

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international trade. Explicitly formulated by David Hume and already present in the work of important thinkers – including Cantillon – it declared that, should the operations of purchase and sale of goods and services coming from a specific country add up to different totals, that difference must be compensated in coin, and that this flow of metal inevitably acted upon the level of prices and income. These, in turn, contributed to a modification in the number of orders and thus in the flow of goods, determining *automatically* (according to this model) the balancing of the active and passive voices and a distribution of gold sufficient to sustain the prices resulting from the process.

Though Verri started from Hume's classic position, he gave it a wholly original development, highlighting just that creativity on which his «economy of supply» depends. In an addition to the 'sixth edition', in fact, Verri goes on to declare the inexactness of Hume's «mechanism» when «universal goods [are] acquired through toil». In this case, the quantity of «specific goods will multiply in proportion to the overall expansion [in quantity] of all goods and the number of contracts will grow in proportion to the means for making them, as we shall presently see; so it follows that universal goods acquired through labor and scattered across a large number of individuals will more rapidly remedy and compensate the bad effects which mass alone is supposed to produce». Where «untiring industry and a florid commerce make the quantity of universal goods grow steadily, they will bring about a new stimulus to industry itself, increase the number of contracts, make internal circulation ever more rapid, make known new commodities for life and new easements, refine the arts and manufactures, invent new models to make them more perfect and construct them more rapidly; everything will breathe culture, fortune and life» (*ibid.*).

Having learned from Hume that the implications of the monetary aspect and of prices in active and passive commerce were not in and of themselves inevitable, so that it was possible to hypothesize a sort of self-regulatory mechanism of exchange between them, Verri ended up reorienting the whole theory by assuming the altering of the relative positions of national and foreign goods. Already when he had compiled his *Estratti da Hume* – and had then reaffirmed forcefully in his presentation of the balance of trade for 1762 – he had shown himself conscious of the fact that this sort of automatic re-balancing might not come into play in daily economic life[25].

[25] A. Moioli, *Nota introduttiva* to P. Verri, *Bilancia del commercio dello stato di Milano*, in Bognetti, G., A. Moioli, P.L. Porta, G. Tonelli (eds), *Scritti di economia, finanza e amministrazione, Edizione nazionale delle opere di Pietro Verri*, Rome, Edizioni di Storia e letteratura, 2003, pp. 459-86, p. 459.

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Even for the famous «Verri formula», as Pier Luigi Porta has again pointed out, Verri's thought does not appear to be at all ingenuously formalizing, however much it may have been subsequently «stiffened» in this sense by Frisi's re-elaboration. In its original version, the 'formula' was already extremely cautious in treating the question of the heuristic potentialities of the formalizing process as applied to society: «So, then, the price of things», Verri wrote, «is to be inferred from the number of sellers as compared to the number of buyers: the more the first increase or the second diminish, by so much will the price become lower, and the more the former are lowered and the latter multiply, so much the more will prices rise. We may use the language of that science which treats quantity, for that is just what we are dealing with, nor do I know of any other way of expressing myself with exactness [...] The price of things will be in direct relation to the number of buyers and in inverse ratio to the number of sellers». This explanation was qualified even more carefully in a sentence inserted into the text in the 'sixth edition', in which Verri, almost anticipating the most obvious objection which would be advanced – that is that the mere number of sellers and buyers is an imperfect indicator of the respective aggregates of supply and demand – declared that, «these ratios are approximately true; for, to be rigorous, the buyers should all purchase equal quantities so that geometric exactitude might be satisfied»[26].

A few thoughts concerning the forms and the significance of the application of mathematical formalism to economic knowledge by those among the leaders of the Lombard Enlightenment engaged in this field might also be stimulated by a new look at the political and ethical sense assigned to this operation in the specific historic/cultural context in which they operated. It was on the occasion of the bicentennial of Galileo's birth, in 1764, that Paolo Frisi wrote the 'Saggio su Galileo' published in *Il Caffè*; rereading it now could furnish a wealth of suggestions for evaluating the deeper meanings in the text. Frisi's essay – which has been defined «a provisional statement, meant to weigh up prevailing judgments and prejudices within the limits [imposed by] an efficacious popular style»[27] – was prompted by the condescendence with which his friend, d'Alembert, conceding only a few lines to Galileo in the *Preliminary Discourse* to the *Encyclopédie*, had

[26] P.L. Porta, *Nota introduttiva*, in G. Bognetti, A. Moioli, P.L. Porta, G. Tonelli (eds.), *Scritti di economia, finanza e amministrazione*, *Edizione nazionale delle opere di Pietro Verri*, tome 2, vol. 2, Rome, Edizioni di Storia e letteratura, 2007, pp. 1-91, pp. 52-3.

[27] P. Casini, *Frisi e Galileo*, in R. Ajello (ed.), *L'Età dei lumi: Studi storici sul Settecento europeo in onore di Franco Venturi*, Naples, Jovene, vol. 2, 1985, pp. 976-85, p. 67.

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referred to the astronomer's merits; «to whose discoveries», he noted, «geography owes much»[28]. With an attentive evaluation of current opinion and an analysis of the historic data, Frisi aimed directly at re-establishing Galileo's key role in the history of science.

«Italians», he declared directly, «might perhaps be suspected of some partiality if they barged in choosing between the two opinions we have outlined and immediately proclaimed the divine Galileo as the greatest genius who, second only to Newton, has honored human kind». The real unacknowledged theme underlying Frisi's synthesis was, however, the question of the ancient primacy of Italian science on the European scene and the consequences of the Holy Office's 1633 condemnation to abjure, both in terms of an irreversible change in the political and social climate within which scientific research was carried out in the peninsula and in the fact that freedom of scientific inquiry had been undermined for the following century. Though caution induced Father Frisi (a heated adversary of the Jesuits, against whose «literary and scientific merits» he had leveled a ferocious attack in an *Elogio del [Bonaventura] Cavalieri*, which remained unpublished for many years) not to center his remarks upon the *Dialogo sopra i due massimi sistemi* in his analysis of Galileo's work, treating instead his successes and failures as the founder of modern mechanics, the underlying framework – made explicit in Frisi's subsequent work – allows us to discern the deeper sense of his intellectual project and of his philosophical/mathematical applications extended to economic culture[29].

In the historic context in which the Lombard Enlightenment elaborated its deductions and its epistemological proposals – and, as well (above all), in the fields of humanistic and social knowledge, engaging in science might then also mean tacitly claiming national pasts of which one was justly proud and, thus, a return to pondering the problem of method. A problem in which some correctly identified one of the basic challenges of the new season of political reform – and which they addressed with acute and mature philosophic awareness.

[28] *Ibid.*

[29] Frisi first reordered and enlarged his considerations in the *Elogio a Galileo Galilei*, written in 1774, when he was already a professor at the Scuole Palatine in Milan, royal censor and a protagonist of the second wave of reform as one of those charged with the technical supervision of the network of Lombard canals. "The militant scientist", concludes Casini, «protagonist of the Theresian reforms, was spurred by an active faith in the enlightened view. This faith was nourished by a coherent conception of scientific reason and had in the very progress of the experimental method its core [...]. Frisi's lucid outline was equal to the times. It reopened Galileo's case and marked a decisive turning point in his posthumous history, laying down the foundations of a subsequent critical historiography» (P. Casini, *Frisi e Galileo,* cit.).

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2. "Nose-ological Elements Demonstrated by Mathematical Method": Readings from *Il Caffè*

«This work was launched by a small group of friends for the pleasure of writing, for love of praise and with the ambition (which they are not ashamed to confess) of awakening a more vital taste for reading in Italian spirits, as well as an esteem for the sciences and the arts, and - *most important* – a love of virtue, honesty; the fulfillment of one's duties»: so recites the appeal "To the reader" in the first issue of *Il Caffè*, setting a program faithfully adhered to and developed in the two years that followed[30].

The "esteem for the sciences" was without doubt among the principal traits of the articles which appeared in the periodical between 1764 and 1766, even though one of the questions most tenaciously examined by these enlightened Lombards was precisely the clarification of the term 'science' and the definition of the limits of applicability of the scientific method to a knowledge of the economy and the society: a task which the adepts of the *Accademia dei Pugni* considered must necessarily regard the reforming intellectual closely, forming part of his "fulfillment of [his] duties", as well as satisfying his love for «virtue» and «honesty». The ample and suggestive description in Verri's *Temple of Ignorance*[31] ('Tempio dell'Ignoranza'), which appeared in one of the first sheets printed by the Enlightened Milanese in 1761, furnishes us with a powerful analysis of cultural structure and knowledge which was the heritage of earlier centuries, and at the same time, formulates a lucid procedural program:

> The vast temple is Gothic in structure, and at the topmost point of its great portal, roughly hewn, an enormous yawning mouth may be discerned; on the two sides of this door stand two statues, one to the right and the other to the left, each naughtily turning its back in the very act of going off in the opposite direction from the other – and on the pedestal of the one we see etched *Theory*, on the other read *Practice*[32].

Thus the schematic, sclerotic, opposition between theory and practice is the premonitory sign of ignorance, which finds its resolution in the long description of the temple's interior nave and, above all, of the crypt hollowed out beneath it, filled with

[30] FR1, 5; the italics are mine.
[31] FR1, 27-9.
[32] FR1, 28-9.

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a host of very solemn sages pottering about and learning by heart, hefty advisors, holdovers, treatise writers; there they are, admiring the dusty medallions, the crumbling inscriptions, the [ritual] pateras, the ancient tripods, some bristly and ill-washed erudites; [...]there they consign to the flames every year, on the appointed day of high solemnity, the works of Bacon, Galileo, and Newton, a copy of *The Spirit of the Laws* and another of *The Treatise on Sensations* [by Condillac][33].

Abstraction, sterile obsequy towards the *Authorities*, vulgar antiquarianism, ignorance of scientific method (emblematically symbolized by the figure of the bonfire) and of the more recent developments of political thought and sensationalism are the traits of ignorance; their opposites give rise to the culture the present era requires. Yet with some limits which the Enlightened Lombards seem well aware of. If it is applied to society, which may indeed, for convenience's sake, be represented in terms of mechanism, still contemporary culture cannot be abstractly analytic: «In nature everything is done by grades. The body politic is a machine whose diverse and complicated wheels are not perceivable to many, nor may many of them be displaced abruptly without creating confusion», he writes in *Elementi di commercio*[34]. «Every shock is fatal and the unfortunate effects disclose to the incautious associations [among elements] of which they had not previously been aware. To take in hand such intervention requires someone who knows the whole mechanics [of the situation] perfectly.»

The very technique of classification – one of the constituting elements of 18th century naturalistic culture – is attentively examined by Cesare Beccaria, as we can clearly see in his *Thoughts on Smells* ('Frammento sugli odori'), in which he distinguishes between «simple» and «composite» odors and classifies the latter in three principal types, «which, however, are not separated in nature if not by minute differences, like every other thing. The classes are merely points of reference which aid our minds in sorting through the variety of natural objects, and often, indeed, lead it astray»[35].

The scientific method proposed by the participants in the Lombard Enlightenment, some of the more significant pages of their review seem to suggest, is then intrinsically systemic and never schematically classificatory. Even – and above all – when it approaches the very fashionable theme of sensations and their relationship to human education. This is an epistemological approach, but at the same time it is

[33] FR1, 29.
[34] FR1, 30-8, 33.
[35] FR1, 39-47, 41.

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ethical and aesthetic, as we can see quite clearly in the poetic analysis of Dante's *Divine Comedy*[36]. Here is how Pietro Verri begins:

What inconceivable sort of people might those pedants ever be who, in situations which are made to excite those quivers in the soul called *sentiment*, instead of surrendering to the magic of the illusion, draw their pendulum or calipers from their pocket to examine them frigidly and to pass judgment on them? You set before them a painting full of poetry and expression [...] [and they] limit themselves to criticizing the draftsmanship and the proportions of a leg or a finger, the uncertain crease in a stocking, or other small defects of the sort, and, puffed up by this discovery, they forego real pleasure with a lightheartedness that ill suits the rarity with which [such moments] occur among the series of our sensations[37].

There could be no more programmatically explicit declaration of the spirit of inquiry adopted by the intellectual circles we are considering than Alessandro Verri's article *The Obeisance* ('Le riverenze') which is satiric as is the *Report Concerning a Prodigious Comet Observed in Milan* ('Relazione d'una prodigiosa cometa osservata in Milano'), in which his brother, Pietro, in high astronomic style, parodies the prodigious hats worn by Teresa Blasco, Cesare Beccaria's wife[38]. In the *Obeisance* (FR 73–8), Alessandro appealed to "friend Demetrio", host of the imaginary café in which his circle periodically gathered, exhorting:

Tell your writers of the Caffè that I am about to publish a very instructive work, whose title will be *A Mathematical-Logical-Political Treatise on the Obeisance*. The title is weighty and I hope to make it brilliant in invention and erudition. You know, oh blessed Demetrio, that the men of our times want analysis, demonstrations and algebraic calculations everywhere; I, as a sensible man, shall use that language and furnish the theory with which to calculate the disposition and character of nations and men concerning the diverse ways of bowing. Let me explain myself. Let us consider the human body as a line perpendicular to the horizon; this line I call *felicity*; let us consider the man lying upon the ground as parallel to the horizon; this line I call *misery;* the angle which these two lines form is, in fact, 90 degrees: that is, a right angle; now, I shall show that all possible bows are comprised between these two terms; and I shall propose the solution of the nature of societies and men derived from the angle to which they are accustomed. I shall

[36] FR1, 50-5.

[37] *Ibid.*, 50.

[38] P. Verri, *Relazione d'una prodigiosa cometa in Milano-1763*, in P. Verri, *Cose varie buone, mediocri, cattive del conte Pietro Verri fatte ne' tempi di sua gioventù, le quali con eroica clemenza ha trascritto di sua mano nell'anno 1763 ad uso soltanto proprio o degl'intimi amici suoi*, in Schettini, M. (ed.), *Milano in Europa*, Milan, Cino del Duca editore, 1963, pp. 103-112. I should like to thank professor Carlo Capra for bringing this work to my attention.

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further show how the perpendicular denotes the distribution of goods and the horizontal their concentration; I shall then add a very exact Table of the various angles that characterize the obeisance in the diverse degrees of latitude[39].

Irony, self-deprecation, a full acceptance of the limits of a method and of a period which sought «everywhere analysis, demonstrations and algebraic calculations», these were the blocks with which the Enlightened Lombards raised a methodologically up to date scientific/critical edifice. Alessandro Verri's introspective critical capacities once again settle upon the inadequacy of any classification which pretends to be definitive, when he adds caustically: «The first bows, barely deviating from the perpendicular, are called obeisance of *protection*, when they are executed by few individuals, and bows of *safety*, when they are executed by the many; they are accompanied by a smile or by 'Your servant, sir' if rare, and by a 'good day, friend', if common»[40].

The so-called 'useful sciences', whose characteristics make them more immediately applicable to forms of manufacture, are singled out for the slowness of their progress towards methodological rigor, without underestimating their importance and, indeed, sometimes highlighting their formal elegance. «A terse style, stripped of superfluous words, is the only one I care for», declared Giuseppe Visconti, as he opened his *Meteorological Observations Taken in Milan. On the Barometer* ('Osservazioni meteorologiche fatte in Milano. Sul barometro'). «Such is the spirit of my native idiom. The time I lost in astrology led me to realize observation and following nature in its phenomena, though slowly, step by step, is the only way to fix some rule or laws in the science of meteors; a science which may also be among the most useful and where, if one should wish to predict movements, there are nothing but chimera and inconsequence»[41].

In the pages of *Il Caffè*, the epistemological debate on traditional knowledge – above all in the field of agriculture – was incessant and waged with no polemic holds barred, in the caustic conviction that, as Pietro Verri tersely put it, «the strongest obstacle all the arts and sciences encounter in perfecting themselves [is] the stubborn preference most men have for the old ways»[42]. The privileged object of polemic deconstruction is naturally superstition: the very emblem of anti-science. A passage in the long essay *On Agriculture. A Dialogue. Afranio and*

[39] FR1, 73.
[40] FR1, 74.
[41] FR1, 72-82, 78.
[42] FR1, 72.

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Cresippo, by the future Inspector of the Milan Mint, Sebastiano Franci, declares: «I should go on at great length, should I wish to represent in detail the worth and usefulness of agriculture; my intent is simply to give you a sufficing [*sic*] idea to make you fall in love with this science, which, Columella declares: *tam discentibus egeat, quam magistris* (lacks pupils as well as teachers)». Franci praises «the learned masters» who have engaged their «sublime capacities in investigating the secrets of nature», among whom Linnaeus, and adds:

> Do not take into any great account the knowledge of the farmers: this produces only a simple, trivial, practice - the same employed by their great, great grandparents and which was never able to advance the science of agriculture by an iota. [...] The idiocy and the simplicity of these poor folk should not, however, dispense you from loving them tenderly and considering them the chief support of human society, in which they have a more important role than that of those who have themselves drawn about the city in handsome coaches. You are dedicated to an art which is the most useful among the earthly sciences, which has been the delight of many crowned heads and was very common to the most powerful citizens, to the conquerors of the world who were the Romans[43].

The continuous oscillation between social elitism and an opening towards professional – when not authentically popular – knowledge, is one of the most typical marks of the style, both as to content and as to language, of *Il Caffè*. In *Some Legislation on Pedantry*[44]. ('Saggio di legislazione sul pedantismo'), Alessandro Verri seems to be joining the discussion to save Franci's pessimistic vision, hitching up forms of knowledge with varied social origins to the wagon of true science, so long as their method shares the same urge towards rigor. «In the sciences and in letters – in every human learning, I dare say – all kinds of coin are necessary», as Alessandro puts it metaphorically; «big, small, of gold or of silver, for as in a State from large gold coins men descend to those in copper or in silver, so that each of them may be facilitated in trade, while whoever cannot spend a doubloon spends a *paolo*, so likewise it is the case to proceed in the sciences». The parallelism between science and trade, intrinsically democratic, opens then, in the purest traditional Enlightened stance, new ways to the formulation of the cognitive itinerary of which the Lombard circle is proud spokesman. «Let all men participate, if possible; let the simple laborer know the tenth part of what the enlightened man knows, let

[43] FR1, 60-71, 71-2.
[44] FR1, 133-40.

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the artisan know three times as much as that laborer, and the merchant more than the artisan; finally, let every living being know somewhat more than how to eat, drink, sleep, yawn, and annoy his neighbor, the which marvelous qualities are wonderfully found together most often in a life without the misery of need»[45].

In the pages of *Il Caffè*, the new enlightened culture is, then, an open form of co-partnership and dialogue, free of discriminations that are not those related to the cognitive method chosen for each separate case. There is no authentic cognitive construct without social relations: «All the human sciences are but a luxury attached to the condition of sociable man», Pietro Verri declares unequivocally in *The Useful Studies* ('Gli studi utili')[46].

> Savage societies go on without any sort of science, but this luxury of reason is what, in fact, distinguishes the crude nations from those civilized; this luxury is what makes customs more gentle and humane; that which provides for infinite needs and ennobles, may I say, our species. Whoever, then, says that a given science is not *useful*, because the world could go on without it, accuses that science of an absolute superfluity common to all the others[47].

Crude men «know that winning a case at law is something *useful*, that curing an illness is *useful*; so they conclude that the science of the laws, the science of medicine, are *useful* sciences». But such men «do not know that intimate and delicate connection which all sciences have between them; nor do they know that there is but one science in the world, whose name is *the discovery of truth*, and that, whatever the *truths* may be, they are always *useful* to mankind and are, in the universal culture in which Europe finds itself in this century, glorious at least for the nation in which more [of them] are discovered». The real difference between ignorance and learning passes, then, through the overcoming of banal purposing of learning to the useful; it is in this framework that the praise of the geometric spirit – which represents one of the most lucid and poetic pages of the entire repertory of the Lombard Enlightenment – is here so fervently expressed.

> I know mathematics – just as they easily disclose even the most unexpected and sublime truths – are, equally, stingy in producing some that are immediately useful; but the geometric spirit is a spirit which spreads through all the sciences and all the arts, perfecting and adorning them in such a way

[45] FR1, 135.
[46] FR1, 311-8, 313.
[47] *Ibid.*, 313.

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that, in the nation where it is most diffuse, every single thing produced must be perfect of its kind. This enlightening spirit mounts the Chairs of lecturers and makes them methodic, exact, precise; it spreads throughout the world of judges and it teaches them to compare facts, to analyze the probabilities and reach correct judgments; it even reaches down to the craftsmen and suggests more compact, safe, industrious, procedures to make their work more perfect. Indeed, each of us can ascertain from experience that all the most efficient and most precise manufactures come to us from nations where the geometric spirit reigns and that, to the contrary, where it does not hold sway, everything is suffused with the coarseness and the inexactitude that characterizes uncultivated nations[48].

«That's enough, friend, I told him, your book doesn't deserve even a Zero». So Pietro Verri, in his essay on *The Fortune of Books*, cut short «a philosopher's» reading of a text he meant to show pretentious and antiquated, and whose opening declared: «The love of feeling well, stronger than that of existence itself, should have the same function for morality as gravity has for mechanics»[49]. The unwarranted extension of the physical-mathematical metaphor is deplored and deprecated in tones echoed in the corrosive title Cesare Beccaria gave to «a work [he is] contemplating in three folio volumes», *Nose-ological Elements Demonstrated by Mathematic Methods*[50]) ('Elementa naseologiae methodo matematica demonstrata'). This is a tone we would seek in vain in the text of the rigorous analysis, written shortly afterwards, by Beccaria and published in *Il Caffè*: the famous *An Analytic Project Concerning Contraband*[51] ('Tentativo analitico su i contrabbandi'). The article, posing the question of what duty ratios would persuade a merchant to trade legally with foreign countries and not, instead, import goods as contraband – hypothesizing that any contraband goods, once discovered, would be confiscated –, took a most cautious position from its very premises, in which Beccaria declared explicitly his conviction that algebra could serve economy «up to a point». He further made a clear distinction between human affairs (the «political sciences») and those of nature, though both shared an inclination towards formalization:

Since algebra is only a precise and rapid way of reasoning on quantity, it cannot be applied to simple geometry or the other mathematical sciences, but everything which may in some sense grow or dwindle, everything which has relations that can be compared, may be submitted to it. Thus even the

[48] *Ibid.*, 314.
[49] FR1, 150-2, 151.
[50] FR1, 44.
[51] FR1, 173-5, 173.

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political sciences can admit [its use] up to a certain point. They deal with the debts and credits of a nation, with taxes, etc.; things which allow calculations and notions of quantity. I said up to a point, because political principles, depending in great part upon the outcome of many, particular, decisions and very varied passions (which cannot be determined with precision), policy constructed on numbers and calculations would be ridiculous and more [appropriate] for the inhabitants of the island of *Laputa* than our Europeans[52].

The skepticism on the results of the formalizing of culture regarding society was, in other famous pages of *Il Caffè*, bolstered by Pietro Verri's implacable demolition of the scientific pretenses of contemporary medical culture. Opening an ample and acute historical and philosophic study on this very touchy subject, *The Medicine* ('La medicina'), he once again anchored his discussion to questions of scientific method. «Medicine is nothing but physics applied to the human body, that is to the machine which even today is very imperfectly known and may perhaps never be so in all its extension»[53].

The mechanistic metaphors do not, however, take on here the usual task of simplification and the tranquilizing functions of schematization which they so frequently assume in 18th century medical texts.

For if the veil which hides from us the principles due to which a healthy body lives, moves, generates, nourishes itself – that is to say, a body in the state in which it is proper to subject it to the greatest number of observations, for it is the *condition* common to the greater part of mankind - is so dense, so much the more must you believe the principles which distort the order of animal economy and make mankind pass out of a healthy into an unwell state to be obscure![54].

From these reflections, supported by robust injections of empiric evidence and free of any awe of the *auctoritates* dutifully cited, Verri briskly draws his conclusions:

[...] a consequence: and that is, medicine will always be very uncertain both in its principles and in the application of these same principles; and a philosopher who makes this his profession, when he has adhered to the most scrupulous diligence in specific cases, will have a cautious doubt as his constant companion and a reasonable Pyrrhonism which will lead him always

[52] FR1, 173-4. Laputa is a flying island of which we read in the Third Part of *The Travels into Several Remote Nations of the World*, by Jonathan Swift (1726); it is inhabited by extremely learned physicists, mathematicians and musicians.

[53] FR1, 200-11, 201.

[54] *Ibid.,* 201.

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to omit rather than overdo as he goes about his work. Aspire to this from the beginning, and know that what has been said perhaps too generically of all the sciences – that is that their extremes touch and that ignorance is equally to be found at both ends – is particularly the case for medicine, in which, if you are mediocre, you think you share nature's secrets but, as you progress and examine your notions with deeper analysis, the number of secrets unveiled declines and you approach learned ignorance; which is waiting as the career's final line [...]. So medicine is, then, an art whose nature is very circumscribed and merits the name of conjectural which is assigned it[55].

Verri's is a praise of doubt and of his *Caffè* interlocutors, who never give in to gross skepticism and are always careful to draw constructive consequences on the formative plane to their epistemological reflections. Just as Pietro outlines – immediately after the methodological *caveat* we have just seen – the formative profile of the good doctor, that is, the specialist in "the science of conjecture":

I shall chiefly seek in a young man the *preparation for science*, that is a constant intellectual habit of analyzing his own ideas, of defining each word exactly – forming almost a well-linked chain of his thoughts – so that the desire for truth remains always stronger in him than the inertia to which, perhaps more than to other causes, we must attribute the greatest part of the fallacious argumentations of mankind. If this disposition of the spirit, which the Scholastics call *Logic*, is the prime foundation of human cognitions, if this is the only reserve which can allow us to make progress in all the sciences, all the more must it be indispensable where the science in question is one of conjecture, where the omission of even one item of data, or of a single observation sometimes leads us to perfectly opposite conclusions[56].

«I shall make here no long pedantic declamations to prove to you that to cure illness and to reason in medicine we need statics, hydrostatics, geometry, algebra and all the other fields of mathematics», he continued, setting aside once again the dubious purpose of pan-formalization. «There is certainly a great deal of deception in such arguments, which are repeated by some poets, repeated by some doctors, and even by some jurists, almost as if their occupations required the *Encyclopédie;* what I will say is that notions of universal physics are necessary, for, as I have already noted, medicine is an application of physics to the human body»[57]. At any rate, nothing is more apt to bring on a crisis in the traditional separation between theory and practice than knowledge regarding the body and health:

[55] *Ibid.*, 203.
[56] *Ibid.*, 203-4.
[57] *Ibid.*, 204.

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A ridiculous pretension, indeed, is that of those who try to hide their ignorance in medical theory bragging of their knowledge of *practice.* The series of disorders to which the machine of the human body is subject is, alas, vast, and in comparison the life of any man is a brief burst of lightning. [...] The observations, the experiences – and, perhaps even more, the fortuitous cases and the very errors of many centuries – have added to the material of that science; from this whole mass, inherited from by-gone generations, a good doctor seeks to deduce his *practice*, which becomes the *practice* of centuries, the *practice* of many men compacted into one single man; and it is this that is the real *practice* respected by those who are wise, from which we may hope to draw benefit[58].

What distinguishes the men of *Il Caffè* – despite the variety of the interests they pursued – from the sterile encyclopedic approach of those who used the new gamut of scientific knowledge as a means of self-centered exhibition, is precisely this constant, diligent and unquenchable questioning (and self-questioning) of what, within contemporary historic coordinates, was to be considered scientific and what was not; of the political significance of science; of the difference between sciences and objects of scientific inquiry; of the very birth and development of the category of science. «Philosophic Man» – Pietro Verri observed in another essay, the *Thoughts on the Spirit of Italy's Literature*[59] ('Pensieri sullo spirito della letteratura d'Italia') –,

was also at that time nearly the same as in the preceding century, except that recent discoveries concerning the globe they inhabited, the busier and more daring navigation, stimulated in some ideas in natural history, in the figure of earth, in celestial observations – and with these, some elementary ideas of geometry. At the end of this great century *Galileo* appeared: the honor of our homeland, *Newton*'s great forerunner, whose name shall remain glorious as long as mankind conserves the habit of thought – the person, finally, whose misadventures will be an eternal mark of shame for the century in which he lived. It was he who first shook the yoke of that science of words which tyrannized men's minds and, without loving or seeking the truth, proudly declared itself *philosophy*[60].

These great «men born to educate others» gave a «new look» to philosophy in Europe, and «though the number of truths discovered in this change be not very ample, the way of reasoning introduced was the cause of discoveries that came afterwards and continue still». This is the cause of the victory of «reason», «and then a man who believed

[58] *Ibid.*, 206.
[59] *Ibid.*, 211-2.
[60] FR1, 213.

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he could explain with the two sole principles of matter and movement all the phenomena of the universe_was termed a *philosopher*». A situation unsatisfactory for Verri, believing as he did that his times had «notably, much [...] improved the condition of minds in Italy and all of Europe», after Newton's discoveries which had «added to the reason Descartes had already brought to philosophy, analysis, its faithful companion»[61]. In the sciences, and in «matters of simple reasoning, he recommended in *To Young Men of Talent Who Fear Pedants* ('Ai giovani d'ingegno che temono i pedanti'), the best judgment is «that which results from serious examination»[62].

The epistemology developed by Verri in his essay on *Medicine* is accompanied by another – briefer and for several aspects hermetic – programmatic discussion: Cesare Beccaria's 1765 essay, *On Periodic Journals*[63] ('De' fogli periodici'). The essay illustrates the various techniques «a periodical writer» must adopt to secure the results most appropriate for this kind of expression, which are «to make virtue respectable, to make it pleasant, to inspire that pathos of enthusiasm for which it seems men for a moment forget themselves for the happiness of others»: these are the Apology, the Dialogue and «those serious arguments that invite one to virtue not for rigorous motives of duty, but for utility's sake; not with geometric demonstrations, but with the sweet enchantment of a smooth eloquence neither exalted nor sublime». Finally, this is the «style of presenting views and highlights that make one think and stir up the ideas of the reader», with the warning, however, that periodical journals «should not serve so much to extend positive ideas as to curb the many negative notions – that is to say, to destroy the prejudices and pre-conceived ideas which make up the embarrassment, the difficulty and, I should almost say, the mountainous and craggy [terrain] of every science». He concludes:

> All these techniques must be weighed up and mixed together with great care because, as each is excellent of its kind, constant change spurs the desire and the curiosity to see what follows, nor is one ever wearied by a boring uniformity, which oozes lethargy and drowsiness over everything[64].

In another suggestive article, *The Pleasures of Imagination*[65] ('I piaceri dell'immaginazione'), Beccaria further observed:

[61] FR1, 216.
[62] FR1, 392-5, 395.
[63] FR 2, 413-6.
[64] FR2, 415-6.
[65] FR2, 476-80.

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Working with one's hands makes the imagination agile and leads to respect for reason, our sovereign, without becoming her servile courtiers – for otherwise she sets leaden seals upon the imagination and obliges you to dig in, where you need to flow. It is not a question of analyzing, but one of composing. Be stingy with pleasing errors and, for heaven's sake do not allow one of Plato's handsome chimeras to slip through your hands for a sober argument by Locke. Gaining a little philosophic indolence in things human is very appropriate for your purpose, in business as in the search for truth, of which you shall neither be an unfaithful nor a rebellious subject, but simply an obscure and idle farmer[66].

For an author in whom we should perhaps be hard put to recognize the same voice as that of *The Attempt at the Analysis of Contrabands*, a «handsome chimera» of Plato's is preferable to the «sober argument» of the beloved Locke, who would not perhaps have approved of this praise of "philosophic indolence" and the sweet invitation to allow things to «slip through [...] your hands» instead of «dig[ging] in». In *Some Thoughts on the Origins of Errors*[67], Pietro Verri, in turn, reminds us that many of our errors have a common origin:

Our errors also originate in the narrow limits of our sensibility, which – whether sometimes shaken, or lacking in vigor – barely reacts to the objects which strike the senses, or indeed, heavily battered and absorbed in a single conquering phantom, sees other things only vaguely and with blurred shapes; in the first case, it finds itself on intermediate steps to sleep, in the latter, on the road that leads to delirium[68].

«Flowing» rather than «digging» may be a good antidote, for those who are engaged in science, to the illusions generated by the senses. In *Some ideas on Moral Philosophy*[69], Alessandro Verri leaves few illusions on this head: «Men hear more or less wholesale what is useful to them, and the actions of their life are directed by a mechanism of sensations rather than a reasoned analysis». «Man is always imbecile», as he put it in the longer *Little Commentary of a Bad Tempered Gentleman Who is Right, on the Definition: Man is a Reasonable Animal, in Which We Shall See What It Is All About*. «[He] makes an effort to scale the cliff of truth, stumbling he reaches it and, from time to time, even up there he plays the child»[70]. The hard work of truth, and the uncertain hold reason offers, open the way to cognitive results that are far from the trusting optimism sometimes still today attributed to enlightened culture and

[66] *Ibid.*, 478.
[67] FR2, 537-9.
[68] FR2, 538.
[69] FR2, 685-95.
[70] FR2, 624-53.

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its way of conceiving science. «Let science fall silent for a moment and opinion hold sway – farewell humankind – you fall back into your deliriums and good-bye until you reawaken. […] Your fears, the taste for the marvelous, the dreams (now weighty, now sad) of your imagination, the deception of the senses in things physical are inexhaustible sources of many strange things that now and again circle round our globe»[71]. The conquests in the art of measurement are not necessarily harbingers of good: «Man then measures distance, weight, the velocity of the planets; he knows then the miracles of mathematics; he has built ships, clocks, carriages, fountains, telescopes, has, in brief, perfected the arts and the sciences in the highest degree; and yet he has no clear, simple and exact ideas of morality».

The ancients based their moral systems on a great and admirable investigation: everything was enthusiasm, the virtues were gigantic. They rarely reasoned; almost always they were poets. In recent times, conversely, it seems all morality is to be reduced to exact analysis. Perhaps neither the one nor the other of these methods is the true one. That of the ancients brought forth proud Stoics, sublime men – very nearly, I should say, monsters – of virtue; but that is simply the effect of a robust enthusiasm which can never be a common trait of mankind; and morality must be common. Yet the chill analysis of some of our modern men carries with it the inconvenience of making them become used to being too straightly on guard towards their own sentiments and to calculate the actions of life with the same detachment [«esatta discussione»] with which they work through a mathematical problem[72].

Reasoning upon good and evil, truth and falsehood, brings him again to mathematics and formalization: but with results it is difficult to connect back to the full and confident participation one seems to find in other pages written during this complex and multifaceted period of our modern history.

Conclusions

From a first reconsideration of the literature and some of the available sources, we can see that the analyses and the projects of the Enlightened Lombards were amply suffused with acceptance and admiration for the scientific method, consolidated in a continuing circulation of individuals and written material among the various European areas between the Sixteen and Seventeen hundreds. A reading of

[71] FR2, 636-7.
[72] See in FR2, 686-94, the article by Pietro Verri *Alcune idee sulla filosofia morale*.

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some of the material published in *Il Caffè* – which should be accompanied by the analysis of the major works and the correspondence of Pietro and Alessandro Verri, Cesare Beccaria, Paolo Frisi and various other participants in the great season of general renewal of political and economic culture which was the latter half of the 18th century in Lombardy – would make it possible to perceive with immediacy the admiration for the mathematical, physical, astronomic and, more broadly, philosophic-scientific tradition that had grown up in the West thanks to Galileo, Bacon, Newton, Harvey, Petty and the other protagonists of the development of the research method we consider 'scientific' today.

However, the admiration of the leading exponents of the Lombard Enlightenment for the methodological/scientific innovations of the preceding decades never becomes the sterile acceptation of pre-existing quantitative schematization, nor the banal imposition of mechanistic readings and interpretations of economic and social systems. Instead, it is precisely in the natural sciences, on the one hand, and in the social sciences (and therefore economics), on the other, that we find one of the original elements of the Lombard Enlightenment: at once a marker of its cultural status as a phenomenon of European significance and of its precocious emancipation from the uncritically 'scientific' patterns evolving in other European areas during the same decades.

So it seems we ought to proceed very carefully indeed in hypothesizing that the members of the enlightened Lombard circle most engaged in the construction of a project of political reform and, thus, in the elaboration of a new economic culture, gave their full and authentic support to the geometric/mechanistic conception of social – and economic – life; or even to Political Economy as a discipline replicating the model of the exact sciences, since that might schematize functional relations to the detriment of the phenomenological and empiric dimension of social and cultural reality.

The richness and the up to date information of the methodological debate appearing in the pages of *Il Caffè* allows far more articulate concepts to come into view – and with implications not of secondary importance for the reformatory political project, both as regards the epistemological aspects that most directly invest the formation of economic culture and as regards the relations between this and the other sciences concerning society.

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