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Malthus's idea of a moral and political science

Sergio Cremaschi

Abstract: This paper discusses, first, the kind of Newtonian methodology Malthus had been exposed to at Cambridge; secondly, the views on algebra and the doctrine of proportions he inherited from MacLaurin and the contribution of his colleague Bewick Bewin in devising a special role for this doctrine in the moral sciences; thirdly, Malthus's ideas on language and the reasons for rejection of an artificial language for political economy. Then it discusses his idea of political economy as a moral science and his claims to be Adam Smith's true heir. The conclusion is that Hollander is right when he contends that Malthus's and Ricardo's *methods*, as contrasted with their *methodologies*, were just two opposite poles within one spectrum, but also that the Cantabrigian and Scottish tradition provided staple for a design of a moral and political science alternative to the Unitarian and the Benthamite programs.

Keywords: moral science, political economy, methodology, doctrine of proportions

Introduction

Malthus's views on philosophical issues are richly documented. What is surprising is the extent to which available evidence has not been taken seriously. In a first phase, due to immediate polemical interest, his ultra-Ricardian adversaries depicted him as a reactionary. McCulloch wrote that "Mr Malthus never had any clear perception of Mr Ricardo's peculiar doctrines, nor was he very successful in elucidating his own" (McCulloch, 1846, p. 485), and it is well-known how Marx, following McCulloch, indicated him as the paramount "vulgar" economist. A British pamphleteer of his time denounced the "illogical structure of his understanding" and his "intellectual infirmities" (de Quincey, 1823, pp. 32 and 34).

Long time after, contingent reasons for such polemical attacks had disappeared; in the second half of the twentieth century what any sensible scholar could feel was that these controversies had left some "confusion in the literature regarding the philosophic tradition to which Malthus belongs" (Paglin, 1973, p. 15). Malthus, in fact, had been ranked with the Benthamites by Bonar, Robbins, and Keynes regarding his ethical and political commitments while, as far as his methodology is considered, Barucci (1972, pp. xxx-xxxii) and Wrigley (1986, p. 35) noted that he was believed to have been an inductivist in political economy and a deductivist in population theory. It is as well to add that Paglin did not help in dissolving the confusion, since he suggested that Malthus's outlook depended mainly on Edmund Burke's conservative counter-enlightenment program (Paglin, 1961, p. 21).

Two or three decades later, Malthus scholarship had become richer and more reasonable, but important questions still wait to be settled. For example, reconstructions were made of Malthus's sources, singling out MacLaurin, Hume, and Dugald Stewart as the main ones (Cremaschi and Dascal, 1996, pp. 476-490; Cremaschi, 1998). Hollander quite plausibly argued that Malthus's and Ricardo's methods "were far closer than is generally supposed" (Hollander, 1997, p. xiii). Cremaschi and Dascal (1998a; 1998b) argued that both Ricardo and Malthus had some identifiable and comparatively peculiar methodological background and that this was directly relevant to their respective work in economic theory, and similarities and differences between them may be accounted, at least to a point, on the basis of partly shared and partly different backgrounds. The present paper adds a more detailed reconstruction, taking more sources into account and concentrating on three topics: the idea of experimental philosophy, the doctrine of proportions, and the anti-conventionalist theory of language.

The Cantabrigian and Scottish idea of an experimental philosophy

Malthus brought into his practice as a social scientist precisely the dowry of ideas he had accumulated during his years at Cambridge. He lived during four decades the life of a college professor who was also a father and a clergyman, and he concentrated his own intellectual energies on the subject to which he found himself, by chance and by calling, committed. This is what one of his friends meant when he wrote that he had been "a utilitarian of the right sort"

(Empson, 1837, p. 478), since, after his general education at Cambridge, he specialized in such a field of study as might prove useful to the community, which is what Utilitarians required and, instead of widening his own intellectual horizons, constantly tried to further specialise in one field or two where he felt he would have been in a position to give some useful contribution. Note that Empson was no way asserting Malthus's adhesion to utilitarian philosophy as a naive reading of his statement would suggest; on the contrary – as a pragmatic interpretation of his speech act indicates – he was attacking the Benthamites, by showing how what they contended for had been already carried out, and indeed in a more competent way than they could ever dream of, precisely by a member of that establishment to which they were dreaming to provide the only alternative. It is remarkable also that Malthus's friend Ricardo was led by different circumstances to travel the opposite direction and, after having written his masterpiece, committed himself to a plan of systematic philosophical and political reading, a circumstance that may accounts for several developments in the last years of his life. In Malthus's case, the reading lists he was assigned while a student at Cambridge remained his intellectual background and it is hardly surprising that his arguments' staple was always a mix of Newtonian methodology, Lockean logic, and Cumberlandian ethics.

Malthus enjoyed an early education far above current standard thanks to Gilbert Wakefield, his tutor for two years, first at Warrington academy, and then, after its shutting down for lack of pupils, at Gilbert Wakefield's home. Warrington Academy was more an institution of further education than a high school. Its primary purpose was to provide advanced education to Dissenters, who were not admitted to Oxford and Cambridge. Between 1757 and 1786, Warrington's most renowned lecturer was Joseph Priestly and it enjoyed the nickname of "Athens of the North" as a mark of the fact that its intellectual importance was no less than that of Oxford and Cambridge. It attracted a number of students who were Anglicans but nevertheless chose a dissenting academy in order to escape lack of intellectual freedom. This appears to have been precisely what Daniel Malthus chose for his son, namely the most enlightened institution available; it may be noted that after the Academy's discontinuation he opted for private instruction under one of its tutors, and then for Cambridge, not Oxford (where he had been educated) possibly because of its image of a less traditionalist institution.

Gilbert Wakefield was a classical scholar who became, soon after his ordination as a deacon in the Church of England, an adept of so-called Arian or Unitarian

doctrines, albeit without connecting himself to any dissenting body. He was a tutor at Warrington until 1783 and in 1790-1791 he was again a tutor at the Unitarian college of Hackney. He was the author of attempts of applying the methods of philology to Scriptures, editions of classical works, a translation of the New Testament, and a number of publications on religious and political issues. In 1798 his rejoinder to a paper by the Cambridge theologian Richard Watson defending war to France yielded him two years imprisonment. Besides Greek, history, and classics, Malthus was trained by Wakefield in mathematics and physics on such textbooks as Vince's *Elements of the Conic Sections* (Vince, 1781), Rutherford's *Propositiones mechanicae* (Rutherford, 1740) in an abridged version, his *Ordo Institutionum Physicarum* (Rutherford, 1743) (see *Malthus to Daniel Malthus* 25 Dec. 1783, in Malthus, 1997-2004, vol. 1, p. 16, and 14 Jan. 1784, *Ibid.*, p. 19).

The training received under Wakefield at Warrington and at the latter's home was advanced enough for Malthus being admitted at second-year classes of mathematics at Jesus College. We have rather detailed information about his study of mathematics and natural philosophy through the correspondence with his father. For example, he informed him that the "chief study is mathematics, for all honour in taking a degree depends upon that science" (*Malthus to Daniel Malthus* 14 Nov. 1784, in Malthus, 1997-2004, vol. 1, pp. 28-29) mentioning such textbooks as MacLaurin's *Account* (MacLaurin, 1748), Keill's *Natural Philosophy* (Keill, 1700), Duncan's *Logick* (1748) and further readings as Newton's *Optics* (Newton, 1704), Rutherford's *Natural Philosophy* (Rutherford, 1748), Long's *Astronomy* (Long, 1742), and Kirwan's *Mineralogy* (Kirwan, 1784) (see *Daniel Malthus to Malthus* 13 Jan. 1786, in Malthus, 1997-2004, vol. 1, p. 38). Later on, he wrote that he was working on Newton's *Principia* and on an introduction to the calculus of fluxions, apparently Colin MacLaurin, *A Treatise of Fluxions* (1742), and, in order to stem his father's insistence on applied mathematics, he explained that the "plan of mathematical and philosophical reading pursued at Cambridge is perhaps too much confined to speculation – The intention seems to be to ground you well in the principles supposing you to apply them at Leisure after your degree" (*Malthus to Daniel Malthus* 18 Jan 1786, in Malthus, 1997-2004, vol. 1, p. 39). He added that in the following term he was expected to attend lectures in astronomy, based on Keill's *Introductio* (Keill, 1718), and Emerson's *Astronomy* (Emerson, 1769).

From these letters, combined with what we know of the intellectual climate at Cambridge in the last decade of the eighteenth century, the intellectual background of the young author of the 1798 *Essay* may be reconstructed in a tolerable way as that of somebody who was trained in mathematics and had first-hand knowledge of Newton's *Principia*. The education he had received "was tantamount, in the circumstances of the day, to producing a Newtonian natural and moral philosopher capable of subjecting all theories to the test of observation and experiment" (Winch, 1987, p. 18; cf. Waterman, 1991a, pp. 82-95; James, 1979, pp. 25-34; Gascoigne, 1989, pp. 142-184).

His tutor at Jesus deserves mention. He was William Frend, who, besides his misfortunes as a champion of religious freedom and pacifism, was a respected mathematician, the author of an algebra textbook remarkable for a few considerations echoing the Royal Society spirit on the dangers of metaphor in scientific language (Frend, 1796-1799, p. x) whence the recommendation follows that such phrases as "square" or "cubic" be expelled from science as sources of confusion, since it is mistaken to suppose "that a word is of little consequence, if it is explained. If that word has a very different meaning in other respect, the learner will confound frequently the different meanings, and pass through life without having a clear idea upon the subject" (*Ibid.*, p. xii).

Going into more detail, a question to be asked is to what theories in matters of method, language, knowledge Malthus was exposed during his Cambridge education. In Keill's *Introduction to Natural Philosophy* he had found a few basic ideas of Newtonian methodology, namely, first, the idea of a "mechanical" philosophy – contrasted with Platonism, Aristotelianism, and Baconianism (Keill, 1700, pp. 3-4) – that be really based on geometry instead of talk about inexistent material substances like the Cartesian ether or Aristotelian items such as "occult qualities" (*Ibid.*, p. 4), and secondly an exposition of three "rules of philosophising":

- (i) "after the Method of the Geometers", to premise "such Definitions, as are necessary to arrive at the Knowledge of things. It is not to be expected that these should be logical Definitions, which consist of *Genus* and *Difference*, or such as discover the intimate Essence and ultimate Cause of the thing defined" (*Ibid.*, p. 8); but definitions of things "by their Properties, chusing out one or more of the simplest, which by Experience we are certain do really belong to the things themselves; and then from them, we shall after a Geometrical manner deduce other Properties of the same things" (*Ibid.*);

- (ii) "to consider only the Conditions that were supposed at first, abstracting for a time from all other Considerations whatever" (*Ibid.*, p. 9);
- (iii) "to begin with the most simple cases first; and having once settled them, we may thence advance to such as are more compounded" (*Ibid.*, p. 10).

MacLaurin's *Account*, besides a semi-technical presentation of Newton's physics, argues the following methodological points. First, while defending Newton against the charge of having denied the conjectural character of science, downplays his emphasis on the exclusion of hypotheses, arguing that he meant to rule out only *groundless* hypotheses (MacLaurin 1748, pp. 29 ff.). He insists that abuse of "hypotheses" had been the source of "variety of opinions and perpetual disputes" among philosophers who had based their theories not on observation of nature but on their "imagination". "Hypotheses were invented, not for reducing facts or observations of a complicated nature to rules and order, (for which purpose they may be of service) but as principles of science" (MacLaurin 1748, p. 94). This is the "old mode of philosophising" by "supposing instead of *enquiring*, and by imagining systems, instead of learning from observation and experience the true constitution of things" (*Ibid.*, p. 7).

Secondly, in his interpretation of the analytic-synthetic method, he qualifies Newton's claim of being able to "deduce" theories from observation, explaining that "in natural philosophy, truth is to be discovered by experiment and observation, with the aid of geometry, only" and we should "proceed by the method of analysis, before we presume to deliver any system synthetically" (*Ibid.*, pp. 90-91).

Thirdly, he defends recourse to analogy but also fixes limits to it. He declares that Newton is less rigid than Descartes, and "when he was not able to demonstrate the causes of the phenomena described in the second [the *Opticks*] more evidently, he endeavours to judge of them, by *analogy*, from what he had found in the greater motions of the system" (*Ibid.*, p. 21; cf. p. 51). There are indeed cases of "abuse of analogy", such as those of the Pythagoreans and of Kepler who, by pursuing "analogies and harmonies" (*Ibid.*, p. 30) have been led into error. Fourthly, he establishes limits also to application of geometry, since the latter is of no use "till data are collected to build on" (*Ibid.*, p. 30).

A fourth point is a vindication of final causes by reminding "how essential the greatest and best philosophers have thought the consideration of final causes to

be to true philosophy" (*Ibid.*, p. 29), and adding that "it gave a particular pleasure to Sir Isaac Newton to see that his philosophy had contributed to promote an attention to them [...] after Descartes and others had endeavoured to banish them" (*Ibid.*).

A fifth point is the idea that natural philosophy is of use in laying "a sure foundation for natural religion and moral philosophy"; this can be done by rising "from the effects thro' the intermediate causes, to the supreme cause. We are, from his work, to seek to know God, and not to pretend to mark out the scheme of his conduct, in nature, from the very deficient ideas we are able to form of that great mysterious Being" (*Ibid.*, p. 90).

The sixth and most important point is a *caveat* against abuse of hypotheses. MacLaurin declares that the reason why natural philosophy did not enjoy the same gradual progress as geometry was that instead of "searching into nature", men retired to "contemplate their own thought" and "gave their imaginations full play", so that "the subterfuges of art were set up in opposition to nature", and "Hypotheses were invented, nor for reducing facts or observations of a complicated nature to rules and order, (for which purpose they may be of service) but as principles of science" (*Ibid.*, p. 94). This is more or less a paraphrase of Newton's fourth rule, which was added in the third edition, and accordingly was missing in several popularisations of the *Principia* that continued to circulate unmodified. This is the most neatly, as it were, anti-*system* and pro-*experience* among Newton's methodological comments, since it prescribes that

in experimental philosophy we are to look upon propositions inferred by general induction from phenomena as accurately or very nearly true, notwithstanding any contrary hypotheses that may be imagined, till such time as other phenomena occur, by which they may either be made more accurate, or liable to exceptions (Newton 1726 [1972], vol. 2, p. 555).

The lesson MacLaurin draws from this rule is that we ought not to abuse our intellectual liberty "by *supposing* instead of *enquiring*, and by imagining systems, instead of learning from observation and experience the true constitution of things" (MacLaurin, 1748, p. 6). Following this warning, the fourth rule became one of the Scottish philosophy's starting-points carrying refusal of 'conjectures' and mistrust of 'systems' and Hume's attack on political doctrines bases on such suppositions as the social contract and Adam Smith's ones on the Cartesian theory of vortexes, rationalist ethical doctrines and

economic systems based on such imaginary ideas of national wealth as those of the Mercantile system draw inspiration precisely from MacLaurin's reading of the fourth rule (see Force, 1987, p. 180 ff.; Cremaschi, 2009, pp. 88-93).

David Hume, even if he still was an author excluded from Cambridge reading lists because of his alleged scepticism and atheism, was a rather obvious reading for Malthus. Needless to recall that he was, with Jean-Jacques Rousseau, one of the two extraordinary 'fairy-godmothers' who had come at his cradle, when he was ten days old, bringing some secret gifts, since they visited Daniel Malthus at his home in Surrey when Hume was helping Rousseau with his search for a country-house in England where he was planning to live for a while (See James, 1979, p. 9). The Malthus library includes the *Essays* (Hume, 1742-1752 [1992]) and *A Treatise of Human Nature* (Hume, 1739-40 [1983]) together with the *History of England* (Hume, 1754-62), and Hume was referred to in the first *Essay* with reference to his probable error in estimates of population of ancient nations (Malthus, 1798 [1986], pp. 55-56) and in the second *Essay*, as one of the four authors where Malthus had found inspiration for his formulation of the principle, together with Robert Wallace, Adam Smith, Richard Price, and then with reference to estimates of population in ancient times, the practice of infanticide in China (Malthus, 1803 [1989], vol. 1, p. 67, p. 330); he is quoted again in the *Principles* concerning estimated revenues in past times (Malthus, 1820 [1989], p. 59 fn) and again in the same work his 'Of refinement in the arts' is quoted on the role of "tastes" in a prosperous country in keeping a nation wealthy and powerful (Malthus, 1820 [1989], p. 406 fn; cf. Hume, 1742-1752 [1992], vol. 1, pp. 389-399, p. 393). And yet, the most striking similarity is not so much with Hume's ideas on population as with his specie-flow mechanism presented in 'Of the balance of trade', whose basic idea is that of explanation of social phenomena by construction of a state of equilibrium analogous to equilibrium in the physical world (See Waterman, 1998). For example,

as any body of water may be raised above the level of the surrounding element, if the former has no communication with the latter, so in money, if the communication be cut off, by any material or physical impediment [...] there may, in such a case, be a very great inequality of money (Hume, 1742-1752 [1992], vol. 1, pp. 330-345, p. 334).

Hume is also among the sources of Malthus's caution with regard to apparently "scientific" treatment of moral and political phenomena. He quotes 'Of the populousness of ancient nations' to the fact that "of all sciences there is none where first appearances are more deceitful than in politics" (Malthus 1803

[1989], vol. 2, p. 185; cf. Hume, 1742-1752 [1992], vol. 1, pp. 381-443, p. 392) drawing the implication that theory is something different from so-called "practice", or piecemeal social theorizing carried out through uncritical transfer of limited experience, like the one deriving from the management of a farm, to society as a whole. The reason is that, in subjects as "complex and delicate" as these, "the partial and immediate effects of a particular mode of giving relief are often directly opposite to the general and permanent consequences" (Malthus 1807 [1986], pp. 7-8).

Textbooks of logic then used at Cambridge are worth looking at. The subject, after the demise of Scholastic syllogistics, was understood as an art of reasoning based on a science of human mind. So, it is not surprising that Book IV of Duncan's *Logick* is entitled "Of Method" and starts with a distinction between the "Analitick" and the "Synthetick" method, being respectively the method of invention and that of instruction, giving then a definition of "science" in terms of "knowledge attended with absolute evidence", a definition on whose basis the term may be properly applied only to that knowledge which "is derived from a contemplation of the Ideas in our own Minds" (Duncan, 1748, p. 320). "Natural" or "experimental" knowledge is instead knowledge relating to objects existing "without" us (that is, in extra-mental world), to their powers, properties, and mutual operations, and this kind of knowledge starts with experience and proceeds through induction and analogy; it is accordingly less than "scientific" knowledge but more than "historical" knowledge, one concerning facts and based on testimony, which proceeds through criticism and probable conjecture. Thus,

in matters of science we argue from the ideas in our own minds, and the connections and relations they have one to another. And as when these relations are set clearly and plainly before us, we cannot avoid perceiving and owning them, hence all the truths of this class produce absolute certainty in the mind, and are attended with a necessary and unavoidable assent. It is otherwise on the case of natural knowledge. Intuition and inward perception have here no place. We discern not the powers and properties of those objects that surround us, by any view and comparison of the ideas of them one with another, but merely by experience, and the impressions they make in the senses. But now the reports of sense happening in some instances to deceive us, we have no infallible assurance that they may not in others; which weakens not a little the evidence attending this kind of knowledge, and leaves room for suspicion and distrust. Nay, what is yet more considerable, as we have no perfect and adequate ideas of bodies, representing their inward constitution, or laying open the Foundation upon which their qualities depend, we can form no universal

propositions about them, applicable with certainty in all particular instances (*Ibid.*, pp. 327-328)

The goal we may establish for ourselves is to "introduce scientific Reasoning into natural knowledge" (*Ibid.*, p. 330), that is to develop strict and mathematical demonstrations about general properties of things ascertained by analogy, even if ultimately derived from experience. This is what was done by Newton who

having determined the laws of gravity by a variety of experiments, and laying it down as a principle, that it operates according to those laws thro' the whole system of nature; had thence in a way of strict demonstration, deduced the whole theory of the heavenly motions. For granting once this *postulatum*, that Gravity belongs universally to all bodies, and that it acts according to their solid content, decreasing with the distance in a given ratio; what Sir Isaac has determined in regard to the planetary motions, follows from bare consideration of our own ideas, That is, necessarily and *scientifically* (*Ibid.*, p. 331).

This is the reason "why many parts of natural philosophy, are honoured with the name of *sciences*", even if their peculiar principles are not founded upon intuition but are just "assumed upon the foundation of experience", that is, because "the theory deduced from these principles, is established by *scientific* reasoning" (*Ibid.*). The alternative way of reasoning followed by the Cartesians and the Aristotelians implies the fallacy of arguing from the fact that consequences deduced from intuitively established premises are necessary and immutable, to the fact that such conclusions exist in the reality external to the mind, as "it does not because I have the Idea of a Circle in my Mind, that therefore a figure answering that Idea, has a real Existence in nature" (*Ibid.*, p. 146) no more than a centaur or a golden mountain would exist simply because I am able to form an idea of them. This way of proceeding provides us just with "Castles in the air of our own building" (*Ibid.*, p. 340).

Also in the Malthus Library (see Jesus College, 1983, p. 180) is the first edition of another then immensely popular short book, that is *The Improvement of the mind* by Isaac Watts (1741), a handbook covering such subjects as a comparison of different methods of "improving", that is observation, reading, instruction by lectures, conversation and study, Socratic disputation, academic or scholastic disputes, enquiring into causes and effects. The "general rules for the improvement of knowledge" provided are considerations like the following:
(i) deeply possess your mind with the vast importance of a good judgement;

(ii) consider the weakness of human nature; (iii) practice some proper method to acquaint yourself with your own ignorance; (iv) presume not too much upon a bright genius; (v) neither must you imagine that large and laborious reasoning and a strong memory can denominate you truly wise; (vi) you should get humility and courage enough to retract any mistake; (vii) watch against the pride of your own reason.

Perhaps more exciting recommendations are those regarding induction, ascription of causal relationships, and multi-causality. On the first point Watts recommends not to be too hasty "to erect general theories from a few particular observations, appearances or experiments" (Watts, 1741, p. 71), for "general observations" may be "drawn from so many particulars as to become certain and indubitable" but they are "to be made with the greater care and caution, lest errors become large and diffusive, if we should mistake in these general notions" (*Ibid.*) unless we lapse into "hasty determination of some universal principles, without a due survey of all the particular cases which may be included in them, is the way to lay a trap for our own understandings in their pursuit of any subject, and we shall often be taken captives into mistake and falsehood" (*Ibid.*). On causes and effects Watts reminds first that "some effects are found by their causes, and some causes by their effects" (*Ibid.*, p. 398). If we are looking for the causes of any particular effect, we should be aware that "like effects have generally like causes, especially [...] in the same sort of subjects" (*Ibid.*, pp. 398-389); when there are several possible causes, we may single out a few circumstances because of which many of those possible causes are excluded in this particular case, and thus select a reduced number of probable causes; we may then succeed in excluding some of them and finally reach, by progressive exclusion, the real and certain cause (*Ibid.*, p. 399); even if coming before another phenomenon is no sufficient condition for being its cause, "yet among the many forerunners we may probably light upon the true cause by further and more particular enquiry" (*Ibid.*, p. 399); and finally, "whether one cause be sufficient to produce the effect [...] endeavour [...] to adjust the degrees of influence that each cause might have in producing the effect" (*Ibid.*, pp. 399-400). In case we are enquiring into the effects of any particular cause we should "consider the nature of every cause apart, and observe what effect every part or property of it will tend to produce" (*Ibid.*, p. 401), then "consider the causes united together; how far the powers or properties of one will hinder or promote the effects of the other; balance the proportions of their influence" (*Ibid.*, p. 402); be aware that "the same cause on different subjects will oftentimes produce

different effects” and “observe events which happen by concurrence of various causes (occasional or produced by experiment)” (*Ibid.*, p. 402); and finally “consider all circumstances which attend the operation of any cause and find out how far any of those has a tendency either to obstruct or promote or change those operations” (*Ibid.*, p. 403). In connection with talk of causes and effects Watts recalls the classical iatro-political simile, or the analogy between the human body and the body politic, but drawing fresh implications, not strangely those we may find in Malthus's writings. Watts adds:

In this manner physicians practice and improve their skills. They consider the various known effects of particular herbs or drugs, they meditate what will be the effects of their composition, and whether the virtues of the one will exalt or diminish the force of the others, or correct any of its nocent qualities. Then they observe the native constitution, and the present temper or circumstances of the patient, and what is likely to be the effect of such a medicine on such a patient. And in all uncommon cases they make wise and cautious experiments, and nicely observe the effects of particular compound medicines on different constitutions and in different diseases, and by these treasuries of just observations they grow up to an honourable degree of skill in the art of healing (*Ibid.*, p. 403).

Note that Watts stresses one implication of the simile, the role of multi-causality, which will become one of Malthus's fixed ideas. In fact, one of Watt's footnotes reads:

In all these cases we must distinguish those causes and effects which are naturally and necessarily connected with each other, from those which have only an accidental or contingent connection. Even in those cases where the effect is but contingent, we may sometimes arrive at a very high degree of probability; yet we cannot arrive at such certainty where the cause operates by an evident and natural necessity, and the effects necessarily follow the operation (*Ibid.*, pp. 404-405).

One more source is Dugald Stewart, the Edinburgh professor who became the Scottish philosophy's spokesman during the years of his career. In 1798, the year of the first *Essay*, the first volume of Stewart's *Elements* had been already circulating for six years, but there is no reason to believe that Malthus was already acquainted with it. In 1820, the year of the *Principles of Political Economy*, the second volume of Stewart's *Elements* had already appeared, the Scottish philosophy was coming near to its own Zenith and it was providing an intellectual background to the *Edinburgh Review* contributors. Yet, the Malthus Library only includes *The Essays on Philosophical Subjects* (Stewart, 1810), the

Dissertation first (Stewart, 1815) and the *Outlines of moral philosophy* (Stewart, 1793) (See Jesus College, 1983, pp. 164-5 and 203). This does not rule out the hypothesis that Malthus may have read the first volume of the *Elements* before 1798 borrowing it from Jesus College Library or the much more probable one that he may have read both the first and the second volume later on, borrowing from Haileybury College Library; in fact there is convincing internal evidence to Malthus's acquaintance with the peculiar theory of language presented in the *Elements*, since it is almost paraphrased in the *Principles*' methodological digressions and this may be enough for considering Stewart to have become one of Malthus's sources in his mature years.

The main claims in Stewart's *Elements* were: (i) an admission of a role for analogy in the construction of theories, albeit with a caveat on abuse thereof (See Stewart, 1792 [1994], pp. 54-55); (ii) refusal of explanation as reduction of phenomena to one principle (See Stewart, 1810 [1994], pp. i-v); (iii) a vindication of the Newtonian methodology interpreted as an attempt "to rise slowly from particular facts to general laws" (*Ibid.*, p. xxi); (iv) a vindication of a peculiar method for the moral sciences vis-à-vis the natural sciences; (v) a criticism of any too close analogy between the physical and the moral laws; (vi) a refusal of the distinction between primary and secondary qualities (See Stewart, 1793, p. 18); (vii) a clear-cut distinction between ultimate causes and principles introduced into theories (Stewart 1792 [1994], p. 479).

For example, along these lines he condemns the principle of association and the connected theory of "vibrations" on which the reductionist theory of the mind rests defended by Joseph Priestley, David Hartley, and more recently by Thomas Belsham (David Ricardo's first intellectual mentor) whom he labels the "alchemists" of the philosophy of mind. Besides, he insists on a demarcation of metaphysics from "experimental philosophy" both in natural and in moral subjects, the same distinction Kant had been drawing almost in the same years; in more detail, he believes that rash simplification arises from confusion of "laws" with "efficient causes", denouncing the absurdity of that "mode of speaking, which seems to refer the order of the universe to *general laws* operating as efficient causes" (Stewart 1792, p. 212), and against "proneness to simplification", in turn encouraged by naïve recourse to analogy (*Ibid.*, p. 180). He also insists on the impossibility of knowing real causes, allegedly expressed by Newton's phrase "*Hypotheses non fingo*" and suggests that what Newton did was not trying to discover the "occult connections" by which Nature binds its

parts together but that he limited himself to reasoning about “particular phenomena, and general laws” (Stewart, 1813, p. 338), contending that efficient causes and essences should be ascribed to “metaphysical speculations” as contrasted with “experimental philosophy”, which verges on phenomena and general laws (Stewart 1792, p. 13).

Stewart does not rule out unconditionally any recourse to analogy. For example, “friction” is a physical analogy he invokes for accounting for moral phenomena, albeit with the warning that it cannot fit perfectly, since friction in the physical world is constant while “friction” in the moral world arises from causes in turn variable, and accordingly,

the difficulties which, in the mechanical arts, limit the application of general principles, remain invariably the same from age to age [...] In the art of government [...] they do not present to the statesman, the same steady subject of examination, which the effects of friction do to the engineer. They arise chiefly from the passions and opinions of men, which are in a state of perpetual change (Stewart, 1792, p. 222; cf. pp. 239 ff. and Stewart, 1813, p. 22).

The main implication of the above remark is that we should be wary of any too direct shift from theory to the real world; another is that the physico-moral analogy itself should not be taken for granted, and that the “different branches of moral and political philosophy” (Stewart, 1792 [1994], pp. 221-253 and 273; 1813 [1994], pp. 284-322) enjoy a status different from that of natural science, not that of a science with a more immediately accessible subject and thus yielding more certain knowledge – as for William of Ockham, Thomas Hobbes, Giambattista Vico – but of a science with a more uncertain status. It is as well to remind that such higher degree of uncertainty of the moral sciences implies more caution than in the science of nature, but does not imply pessimism, since the iatro-political analogy intervenes granting self-correction of human errors via Adam Smith's idea of the “animal principle”, echoed by Stewart when he declares that “the errors of human art are frequently corrected and concealed by the wisdom of nature” (Stewart, 1792 [1994], p. 226).

At the end of this overview, two different considerations are in order. The first is that the list of ‘influences’ to which Malthus was exposed is well-documented both in terms of external evidence, that is, facts such as the presence of one book in Jesus College reading lists or in Malthus's library, and in terms of internal evidence, as I will argue in more detail in the following paragraph, that is,

direct reference in writing by Malthus himself to individual authors or strong similarity of ideas argued by Malthus with one of the authors we may assume (on an independent basis) that he had read. The second is that reconstruction of influences matters, but just to a point, that is, it is important to know whether one particular methodological idea has been found by Malthus in Dugald Stewart and at what stage in his intellectual career, but also that it may have looked to Malthus more as a development of ideas he was already familiar with than as something completely new, for the so-called 'Scottish philosophy' resulted from a sum of sources with which Malthus had direct acquaintance, first of all MacLaurin and Hume, and it shared a number of themes with other non-Scottish sources, for example Watts, and instead had as many points of agreement as of disagreement with another non-Scottish school, namely the Hartley-Priestley-Belsham school.

Malthus seems to have kept always in mind the methodology he had learned at Cambridge. In the first *Essay* he mentions the commonplace opposition of the "consistent theory of Newton" and "the wild and eccentric hypotheses of Descartes", where the latter are assumed to be an example of the "old mode of philosophizing" (Malthus, 1798 [1986], p. 59) based on "mere conjectures", "wild flights and unsupported assertions" (*Ibid.*, p. 60 fn.), or "suppositions, the probable realization of which cannot be inferred upon any just philosophical grounds" (*Ibid.*, p. 8), and making "facts bend to systems, instead of establishing systems upon facts" (*Ibid.*, p. 59), able at best "to offer an unfounded conjecture unsupported by any philosophical probabilities" (*Ibid.*, p. 78). This is contrasted with "the new mode of philosophizing", thanks to which "science has of late made such rapid advances" (*Ibid.*, p. 60), a mode based on "patient investigation, and well authenticated proofs" (*Ibid.*, p. 60 fn.; cf. 90), or on "experience", which is "the true source and foundation of all Knowledge" (*Ibid.*, p. 10), or on a "train of reasonings from effects to causes" (*Ibid.*, p. 59) affording the only way of reading "the book of nature" (*Ibid.*, p. 59). The conjectural way adopted by William Godwin and other social thinkers who draw fanciful projects of perfect social institutions is the "loosest", and "most erroneous" way of reasoning about man and society, no more plausible than "calculating the velocity of a falling body *in vacuo*, and persisting in it, that it would be the same through whatever resisting medium it might fall" (*Ibid.*, p. 90). Godwin refers to "some obscure and occult cause" in order to take the effect for granted that the size of population will follow that of the means of subsistence while Malthus on the contrary predicts that precisely the opposite effect will be produced by referring to "a cause, open

to our researches, within our view, a cause, which has constantly been observed to operate [...] in every state in which man has been placed" (*Ibid.*, p. 70). This "old mode" was not Newton's mode of philosophizing, since, in order to "make the general theory just [...] it was necessary to calculate accurately, the disturbing force of the sun upon the moon, and the moon upon the earth" (*Ibid.*). It is worth noting that most of these considerations are taken from MacLaurin, and were commonplace for any educated reader for whom such expressions like "the old mode of philosophizing" were familiar keywords (See Cremaschi, 2002, 2009).

Malthus does not only refer to Newton against political utopianism, but has clear in mind that the "new science" of political economy was too a result of the new mode of philosophizing, and *The Wealth of Nations* is its best example in the field (Malthus, 1798 [1986], pp. 7-8), and indeed, toward the end of his career, plays the trump of Adam Smith's authority against the New school or the Ricardians. For example, in *On Political Economy*, he repeats Dugald Stewart's description of Adam Smith as "the Newton" of political economy (Malthus, 1824 [1986], p. 257) and on other occasions is keen in referring to Smith as *his own* model and exemplar as contrasted with the "New School", that is the Ricardian School (See Malthus, 1820 [1989], vol. 1, pp. 2-7), or cites approvingly McCulloch's declaration that Smith "has done for political economy, what the Principia of Newton did for physics" (Malthus, 1824 [1986], p. 257). In this vein, he invokes Newton's authority no more against political utopianism but instead against theoretical over-simplification, mentioning "the admirable rule of Newton, not to admit more causes than are necessary to the solution of the phenomena we are considering" (Malthus, 1820 [1989], p. 8) – that is to "analysis", the first stage of scientific explanation, starting with phenomena and heading to principles – but he adds that "the rule itself implies, that those which really are necessary must be admitted" (*Ibid.*).

Not surprisingly, this anti-Cartesian philosophy shows up also in Malthus's sermons. In one of them he exposes his own version of the commonplace limits-to-knowledge thesis that may be found in the Scottish philosophers as well as in the alternative Priestley-Hartley-Belsham school (not to mention their German contemporary Immanuel Kant) while commenting on *Deuteronomy* 29:29. The passage sounds as follows: "Hidden things belong to the Lord our God, but revealed things are for us and our children, forever, so that we practice all the words of this law". Malthus comments that desire of knowledge is natural to the mind of man, and this provides a great incitement to

that advancement of our reasonable faculties so suitable to our nature, necessary to our present condition, part of our future everlasting happiness" (Malthus, 1997-2004, vol. 2, p. 21) but our abilities yet are greatly circumscribed, since "natural causes of every kind, and final causes for the most part that is, the modes by which nature operates in every instance, and its destination in most, are utterly unknown to us" (*Ibid.*). This implies, among other things, that we should "pursue and cultivate those truths that are within our reach: and cultivate the knowledge which are capable of attaining to" (*Ibid.*). Besides, "the great end and design of all religion is *practice*" (*Ibid.*, p. 23) and accordingly, for the same reasons why in natural philosophy we should avoid "conjectures", in divinity we should drop *dogmatic* theology, that is, the hotchpotch of Scriptures and Metaphysics stigmatized by Voltaire and others as the quintessence of Scholastic nonsense and "questions relating to the essence of the divine nature, the general decrees and counsels of God, the secret and particular designs of providence" (*Ibid.*, p. 22).

The structure of the first *Essay* is a somewhat scholastic application of the methodological and rhetorical rules Malthus had learned as a student. For example it follows what in Scholastic and early modern logic was named the synthetic method, which consists in stating the general principles at the outset, and then deducing step by step consequences, which are descriptions of phenomena whose truth has to be confirmed by observation (See MacLaurin, 1748 [2004], p. 9; Duncan, 1748 [1970], p. 75; see also Walzer, 1987, pp. 6-13). This, as it has been illustrated above, is the way adopted by Hume in *Of the Balance of Trade*, where he takes as starting-points postulates or hypotheses chosen on the basis of analogy from the physical to the moral world (Hume, 1852 [1992], p. 333), and then deduces phenomena to be confirmed by "experience". This is also similar to the structure of Adam Smith's *The Wealth of Nations* if it may be interpreted, as the contemporary Robert Pownall did, as composed of an analysis that starts with a few phenomena and ends up with principles, and a synthesis that starts with the established principles and comes down to other phenomena (See Cremaschi, 1981; 1984, pp. 130-138; 2009, pp. 88-93).

Refusal of abhorred "conjectures" is announced at the very beginning, putting out of question "all mere conjectures; that is, all suppositions, the probable realization of which cannot be inferred upon any just philosophical ground" (Malthus, 1798 [1986], p. 8) and proclaiming the "acknowledged truth in

philosophy" that "a just theory will always be confirmed by experiment" (*Ibid.*, pp. 6-7). Two "postulates" or "laws" of human nature – as contrasted with wild "conjectures" – are then introduced:

First, that food is necessary to the existence of man.

Secondly, that the passion between the sexes is necessary, and will remain nearly in its present state (*Ibid.*, p. 8).

From these starting points consequences should be deduced to be confirmed by "experience, the true source and foundation of all knowledge" (*Ibid.*, p. 10). In other words, the structure of the first *Essay* corresponds to the "synthetic" method or it consists of "composition". It is worth noting that also in following works the structure is still based on the analytic-synthetic method, and that the second *Essay*, far from being an example of a "modern" scientific treatise as contrasted with the allegedly still "metaphysical" structure of the first, has the same structure. What has dazzled most interpreters is the circumstance that it drops the final theological queries, thus allegedly marking the end of metaphysics (happily coincident with the shift from the 18th to the 19th century), but the fact is that the two theological chapter have never been dropped but instead have been moved – after re-writing – from the periphery to the centre of the work, thus becoming chs.1 and 2 of the fourth book.

The principle of population, formulated in terms of different progressions of population and necessities kept at the same level by the action of a third force, has been conceived of starting with a dynamic model like those adopted by Hume and Adam Smith (See Waterman, 1998; CreMASchi, 2002). The formula according to which "Population, when unchecked, increases in geometrical ratio" and "Subsistence increases only in an arithmetical ratio" (Malthus, 1798 [1986], p. 9) is presented as a *self-evident* truth applying in an ideal case, and made plausible enough by consideration of the further reproductive power carried by the offspring after any increase in population. In the second *Essay* Malthus tries to turn the principle into something more like a general law grounded on empirical evidence. After providing some data on population growth in North America – which were far from accurate, in so far as no attempt to distinguish the contribution made by immigration was made – he concludes:

It may safely be pronounced, therefore, that population, when unchecked, goes on doubling itself every twenty five years, or increases in a geometrical ratio (Malthus 1803 [1989], vol. 1, p. 12).

The second part of the law is grounded in considerations concerning decreasing productivity of cultivated land. The remark has often been made that, *qua* empirical description, they are flawed by not trying to make room for effects of technical improvements on the productivity of the soil. Malthus actually is aware that he is starting with an idealised model, and his claim is that, even if we were to

suppose that the yearly additions which might be made to the former average produce, instead of decreasing [...] were to remain the same; and that the produce of this island [Great Britain] might be increased every twenty years, by a quantity equal to what it at present produces [...] It may be fairly pronounced, therefore, that, considering the present average state of the earth, the means of subsistence, under circumstances the most favourable to human industry, could not possibly be made to increase faster than in an arithmetical ratio (*Ibid.*, p. 15; cf. Malthus (1798 [1986], pp. 14-17).

The problem is formulated in terms similar to those of Hume's *Of the balance of trade*, that is, it is seen as analogous to the problem of composition of forces in the physical world. The function played by the tendency of fluids to come back to an equal level in Hume's model of specie flow is carried out here by "the strong law of necessity" that acts "as a check upon the greater power" of population so that the growth in the production of food and population growth are kept at the same level.

Coming at individual methodological issues, Malthus insists that the laws of human nature he introduces are not "conjectures" or the results of "speculation" as those invoked by Godwin, but are based instead on "plain facts open to investigation of every inquiring mind which allow for principles that have already been explained in part by Hume, and more at large by Dr Adam Smith" (*Ibid.*, p. 7). No "miraculous interposition of heaven" (*Ibid.*, p. 48) is implied, but only observed facts and hypotheses that may be submitted to the test of experience. The causes of such phenomena as the different proportions of births to deaths at different times and places and laws such as the one according to which population cannot increase beyond the food which can be produced are "not remote, latent and mysterious; but near to us, round about us, and open to the investigation of every inquiring mind [...] so open to our view, so obvious and evident to our understandings, and so completely confirmed by the experience of every age" (*Ibid.*, p. 48), that we cannot doubt their existence. It is as well to match these words with those by Roger Cotes, Newton's assistant, who had

written that the task of "true philosophy" is to derive the nature of things "from causes *truly existent*" or from "those laws" upon which God "*actually* chose to found this most beautiful Frame of the World" (Cotes, 1726 [1972], p. xxvii; emphasis added). Yet, there is a twofold reference, both to Newton and to the Bible, hidden in Malthus's talk of laws which are "near to us", for the phrase recalls the following Biblical verse, one that Malthus could safely assume his audience was familiar with: "But the word is very nigh unto thee, in thy mouth, and in thy heart" (*Deut* 30.14).

An item of Scottish methodology is the role ascribed to "friction" or, in other words, to multi-causality. As soon as 1798 Malthus warns that

so much friction, and so many minute circumstances occur in practice, which is next to impossible for the most enlarged and penetrating mind to foresee, that on few subjects can any theory be pronounced just, that has not stood the test of experience (Malthus 1798 [1986], p. 7).

The main implication is stressing difference instead of analogy between human body and the body politic, that is, the old iatro-political simile with a new "implicature", namely that society is indeed an organism endowed with self-healing power, but it is composed of individuals and, since the healing of wounds requires a long time, "much misery may be endured before the wound grows up again" (Malthus 1798 [1986], p. 97). In later works reference to "friction" and multi-causality is recurrent, as in the *Principles* where, while trying to assess his disagreement with Ricardo, he construes it in terms of an alternative between a faithful reading of Newton's rule that would not allow for "more causes than are necessary", but also would imply that "those which are really necessary must be admitted" and "an unwillingness to acknowledge the operation of more causes than one" (Malthus 1820 [1989], vol. 1, p. 8). For example, ascribing to one cause, i.e. labour costs, the rise and fall of the rate of profit, implies overlooking other concomitant causes, such as "the principle of demand and supply and competition" (*Ibid.*, p. 336) and this "would not be merely like overlooking the resistance of the air in a falling body, but like overlooking the change of direction given to a ball by a second impulse acting at a different angle from the first" (*Ibid.*, p. 309).

One of the most frequently noticed among Malthus's attitudes is his fear of excessive simplification. In the light of what has been said so far, this should not be explained away in terms of temperament, nor should it be ascribed to some

kind of historicist contempt of theorizing, but may instead be safely interpreted in terms of the anti-Cartesian or Newtonian methodological tradition that has been illustrated. In fact, in the "Introduction" to the *Principles* Malthus singles out two opposing sources of error in political economy: the first is "a precipitate attempt to simplify and generalize" (Malthus 1820 [1989], vol. 1, p. 6); the second is the temptation to mistake "appearances, which are merely co-existent and incidental [...] for causes" (*Ibid.*, p. 21). Against the Ricardian school's tendency to premature generalization he insists on being prepared "to acknowledge the operation of more causes than one in the production of particular effects" (*Ibid.*, p. 6) and it is precisely unwillingness to take multi-causality into account that he criticizes on more than one occasion in his letters to Ricardo. He also warns against "sweeping generalizations" that appear "to be fatal to all clear explanation of the means by which the final result is attained" (Malthus 1824 [1986], p. 262) and insists on need to admit "limitations and exceptions" (Malthus 1820 [1989], vol. 1, p. 8; cf. p. 13), which are to be admitted in any classification, not only in those of political economy, for, since this rule holds for "the watchmaker, the anatomist, and the natural philosopher" why "it should be different with the political economist"? (Malthus 1824 [1986], p. 262). Tendency to over-simplification goes hand-in-hand with an uncritical identification of the moral sciences with mathematics because of which Say, Mill, and Ricardo have "considered commodities as if they were so many mathematical figures or arithmetical characters" (Malthus 1820 [1989], vol. 1, p. 355). This is a reason for comparing "the new school" with Physiocracy, that is, both "systems were equally distinguished for their discordance with common notions, the apparent closeness of their reasonings, and the mathematical precision of their calculations and conclusions founded on their assumed data" (Malthus 1824 [1986], p. 297). The opposing error of mistaking appearances for causes, that is even more damaging than the former in so far as it leads to a theory which is "both complex and incorrect" (Malthus 1820 [1989], vol. 1, p. 21), is the one committed by the "practical men", and in a few cases even by Adam Smith, for ex. when he drew, from the low price of wheat during the first half of the eighteenth century, the wrong inference that wheat "is generally cheaper in rich than in poor countries". Malthus believes that his own approach escapes both errors by opening a third way between dogmatism and naive empiricism, an idea which, besides being a legacy of his Cambridge education, is a sort of obsession for Malthus, showing up in contexts as different as his methodological

assessments and his positive theories, think of his ideas on the role for unproductive labourers in keeping effective demand high enough.

Besides these two main causes of error, there is a third one, namely, unwillingness to bring theories to the test of experience. Ricardo and his followers stick to their own theories even if they prove "inconsistent with general experience" and yet this is a proof that such theories are "either radically false, or essentially incomplete" (*Ibid.*, pp. 10-11; cf. Wrigley, 1986, p. 35; Würigler, 1957, p. 197). It is worth noting that Malthus answers a question that will be debated at length by twentieth-century philosophers of science, that is, he defends a holistic view of the empirical constraints posed by facts on theories arguing that an "isolated fact" cannot refute a theory, in so far as a "consistent theory, which would account for the great mass of phenomena observable" should not be thought to be "invalidated by a few discordant appearances, the reality and the bearings of which there might not have been an opportunity of fully examining" (Malthus 1820 [1989], vol. 1, p. 10). His requirement is that the principles of political economy "be carefully founded on an experience sufficiently extended" (*Ibid.*, p. 518) and the extension of required experience is what marks the difference between his "middle" way and the "practical" attitude (See Malthus 1824 [1986], p. 55). A comparison is in order with Dugald Stewart's remark on misapplication of the words "experience" and "induction" in political economy (See Stewart, 1813 [1994], pp. 330-5).

Also the idea of a legitimate role for analogy is recurrent in Malthus's writings. Appeal is made to analogy on several occasions in order to rule out extravagant hypotheses, for ex. in the first *Essay*, against Condorcet, arguing that we can seldom, "consistently with true philosophy", quit the rule not to "expect any specific event that was not indicated by some kind of analogy in the past" (Malthus 1798 [1986], p. 86 fn.). In the *Principles*, Malthus appeals to analogy in the context of the familiar iatro-political simile, in support of *Laissez Faire* arguing that, since the "ablest physicians are the most sparing in the use of medicine, and the most inclined to trust to the healing power of nature" (Malthus 1820 [1989], vol. 1, p. 20), also governments should refrain from intervening in their subjects' business unless it has been proved with overwhelming evidence that they should do so. At another place, the same analogy is referred to in order to limit a conclusion that may be drawn from the principle of population, stressing the importance of what happens in the course of "intervals" between two permanent states. He writes:

If the human body had been subjected to a very powerful stimulus, we should surely be cautious not to remove it too suddenly. And, if the country had been unfortunately subjected to the excitement of a long continuance of excessive expenditure, it surely must be against all analogy and all general principle, to look for the immediate remedy of it in a great and sudden contraction of consumption (*Ibid.*, vol. I, pp. 520-1).

Algebra and the doctrine of proportions

An intriguing aspect of Malthus' methodology is the "doctrine of proportions". The importance of this doctrine for Malthus had been noted by Empson who wrote that the

dependence of wealth upon proportions is the main doctrine of the latter part of his Principles of Political Economy. He believed in the universal prevalence of a law resembling the law de maximis et minimis in fluxions [...] All regulation proceeds upon proportion [...] It was a truth he was constantly repeating in different ways [...] And he has added a note (Principles, p. 376), for the express purpose of reminding the reader that it is not in political economy alone that so much depends upon proportions, but throughout the whole range of nature and art (Empson, 1837, p. 476).

In other words, both in the phenomena studied by natural sciences and in those studied by the moral and political sciences (what Empson means by the terms *nature* and *art*, itself an established conceptual couple of terms in sixteenth- and seventeenth-century culture) there is a law similar to the law de *maximis and minimis* in the calculus of fluxions, that is the form of differential calculus invented by Newton as a tool for his own physics. Empson added that in "all things appertaining to politics and morals, extreme cases alter the whole question. Whatever depends upon proportion must necessarily be always matter of degree" (*Ibid.*, p. 479). This sounds well-enough, and would imply for Malthus scholars just studying a bit of history of mathematics in order to find out what kind of doctrine was taught in eighteenth-century Cambridge under that label. But Empson himself did his best to put later interpreters on the wrong track. He immediately added: "The lesson which he sought to impress on others, he faithfully applied to himself; and successfully, that few characters have ever existed of more perfect symmetry and order" (*Ibid.*, p. 476). This may have sounded just a *bon mot* for gentlemen who had studied algebra on MacLaurin, and deviant use of the terms "symmetry and order" would have resulted perfectly

clear to them. The expression turned out to be less felicitous when read by less educated and more distant interpreters who ignored what "fluxions" were and what the "problem of proportions" had meant for Greek geometry, medieval mathematics, and then Galileo, Fermat, and MacLaurin. This is why the above remarks have been commented in helplessly vague terms by Bonar, who seems to believe that Malthus was at once a Utilitarian who believed in utility as the only guide of conduct and an Aristotelian who believed in teleology and in the golden mean, that is "what is too much or too little", or something "we can only know by our own and others' experience of the consequences of actions" (Bonar, 1885, p. 320).

The merit of having rediscovered the importance of the doctrine of proportions may be credited to Pullen (1982), and yet he approached the issue in the usual unhistorical way, tailoring Malthus's utterances to fit one twentieth-century economic doctrine, then submitting him to a test in this discipline, and discovering that he did not pass the test (See Waterman, 1998, p. 593); in other words, Pullen declares first that Malthus's "doctrine of proportions is essentially the same as the concept of optimum" (Pullen, 1982, p. 270) and lists it after those of population, diminishing returns, effective demand as one more Malthusian economic doctrine (*Ibid.*, p. 285). Then he explains Malthus's lack of proficiency in the doctrine by referring to Malthus's own alleged admission of not having ever been very familiar with algebra, quoting to this effect a letter to William Whewell of May 26th 1829 where he just admits his lack of familiarity "with the present algebraic notation" (De Marchi and Sturges, p. 387; cf. 'Malthus to Whewell', May 31st 1831, *ibid.*, p. 390), that is, with the one used in the Thirties of the nineteenth century, different from the one used fifty years before, when he was a student. Besides he seems to believe that Malthus's reasons for adopting the doctrine were psychological, related to his own character, and that it is more or less the same as the Aristotelian doctrine of the just mean.

Hartwick (1988) notes that Malthus talks of arithmetical "proportion" instead of arithmetical "progression", thinks Malthus is guilty of confusion, and asks the question whether Malthus knew any mathematics at all. Actually precise definitions of ratio, proportion, arithmetical progression and geometrical progression may be found in Bridge (1810, pp. 133, 134, 170, 183) and the reader may safely assume that Malthus was adopting current definitions of such terms as may be found in an introductory textbook written by one of his colleagues.

Maccabelli (1997, pp. 203-208) is quite right in arguing that just identifying proportion with optimum, as Pullen does, may lead us astray, and that a too simple identification between the doctrine of proportion and what modern economic analysis calls balanced growth is one more example of anachronism since Malthus's doctrine is something peculiar, not a clumsy formulation of later theories, but I feel he goes too far when he insists that the idea of proportion for Malthus was not a mathematical concept, "to which we usually associate ideas of certainty and precision" (*Ibid.*, p. 206), and that instead a "qualitative" aspect prevails, in tune with Malthus's view of political economy as a moral and political science, and he suggests that the previous career of the notion in the history of mathematics is not so important as its Aristotelian character, and even that Malthus fails to spell out what he means by doctrine of proportions (*Ibid.*, 207).

A reasonable suggestion is that Bonar and Pullen are simply wrong, and Maccabelli is right when he denies what the former had said, and he is right also in noting that the concept in Malthus has just a "qualitative" character (if this means that Malthus never tried to apply the calculus of fluxions to economic problems but just highlighted similarities between economic problems and one geometrical problem treated by such calculus), but he should have also denied that the doctrine of proportions has something to do with Aristotelian middle – something that both Bonar and Pullen say, albeit without caring too much for consistency with other claims they endorse. More in detail, my claim is that the doctrine is a mathematical doctrine, not a moral one, that it has nothing to do with the Aristotelian doctrine of the middle, that Malthus failed to spell out in detail what he meant simply because he was pointing at something he believed his readers were familiar with, that "precision" is not tantamount with "certainty" and indeed this doctrine was a very precise affaire, but one leading to the conclusion that we unavoidably lacked certainty on some subjects. In order to substantiate my claims, two steps may be taken. The first is summarizing information from standard histories of mathematics. What can be obtained from such sources is that, starting with ancient Greek mathematicians and Aristotle's *Physics* and reaching Scholastic dynamics, the doctrine was meant as a tool for describing functional interdependence. The notion shows up in Euler's *Methodus inveniendi lineas curvas* (1744) as well as in Newton's *Principia* (1726) (See Mainzer, 1995; Kambartel, Kranz and Schram, 1971-2004; Murdoch, 1963; Grosholz, 1987).

The second step is looking at those that apparently were Malthus's sources. It sounds rather obvious, but no one seems to have thought of it before. It may be useful to recall that Malthus – if we are to believe Empson – did not waste his time in widening his own general education, but specialized in one or two “useful subjects”, while making the best of the education he had received as a student, and besides that he had colleagues who taught mathematics at Haileybury college, to whose help he had recourse more than once. A rather obvious suggestion is that, in order to understand what Malthus meant when mentioning fluxions and the problem *de maximis et minimis*, we may just look at MacLaurin's textbook where Malthus studied algebra, as well as to the textbooks written by his Haileybury colleagues.

MacLaurin was the author, among other things, of *A Treatise of Fluxions* (1742) and a *Treatise of Algebra* (1748) that were apparently in Malthus's reading lists, since he mentions MacLaurin's “second part” in connection with a mathematics course. MacLaurin, in the *Treatise of Algebra*, ch. 9 ‘Of proportions’, gives a technical definition of the terms ‘arithmetical’ and ‘geometrical’ ratio, declaring that when quantities of the same kind are compared, “it may be considered either how much the one is greater than the other, and what is their *difference*, or, it may be considered how many times the one is contained in the other; or, more generally, what is their *quotient*” (MacLaurin, 1748, pp. 54-55); the first relation of quantities is their arithmetical ratio; the second their geometrical ratio. And he adds by way of example: “When of four quantities the difference betwixt the first and second is equal to the difference betwixt the third and fourth, those quantities are called *Arithmetical proportionals*, as the numbers 3, 7, 12, 16. And the quantities, a, a + b, e, e + b. But quantities form a series in arithmetical proportion, when they “*increase or decrease by the same constant difference*. As [...] the numbers, 1, 2, 3, 4, 5 & c.” (*Ibid.*, p. 56). Instead, if “in the four quantities the quotient of the *first* and *second* be equal to the quotient of the *third* and *fourth*, then those quantities are said to be in *Geometrical proportion*. Such are the numbers 2, 6, 4, 12” (*Ibid.*, pp. 57-8).

In his *Treatise of Fluxions*, ch. 9, book 1, MacLaurin illustrates the problem *de maximis et minimis* (MacLaurin 1742, vol. 1, pp. 214-218), that is, the way of determining the possible tangents to one given curve. He adds that this problem, one of the most useful and entertaining in geometry, has been discussed by several of the ancient geometricians who unfortunately lacked any general

method for resolving problems of this kind (*Ibid.*, § 238). The first general solution, afforded by Pierre De Fermat, a seventeenth-century French mathematician, is the following:

When the nature of a variable quantity is such, that it either increases continually without end, or decreases till it vanishes, its greatest or least magnitude is not assignable; and there is no place for enquiries of this nature. But, when there is a certain limit which the increase or decrease of the variable quantity cannot pass, and the term is assignable when it arrives at this limit; or, more generally, when for some time the variable quantity first increases till a certain assignable term, and then decreases, or first decreases till such a term and then increases: its magnitude at that term is considered as a *maximum*, or *minimum*, without regard to its variations in other parts of the time (*Ibid.*, § 239).

And MacLaurin adds:

In the problems of this kind of the first degree, the variable quantity is represented by an ordinate of a curve the nature of which is supposed to be defined by what is given concerning the variable quantity. A curve line either returns into itself, or may be continued without end; and therefore there are always two branches of the curve that proceed from any point that is assignable in it. The ordinate from a point of the curve is a *maximum*, or *minimum*, when it is greater or less than the ordinates which may be drawn from the parts of either branch of the curve adjoining to that point. When the curve is continued immediately from that point on both sides of the ordinate, we shall call the ordinate a *maximum* or *minimum* of the *first kind*, but of the *second kind* when the curve is reflected from the ordinate and both the branches of the curve are on the same side of it (*Ibid.*, § 240).

Bewick Bridge, a former student of St. Peter's College, Cambridge, served as a professor of Mathematics at the East India College. He published the *Lectures on the Elements of Algebra* (1810) that went through several editions (from the third on under the title *An Elementary Treatise on Algebra*) and also *An Introduction to the Study of the Mathematical Principles of Natural Philosophy* (1813). The technical assistance he offered to Malthus is now well-documented (See Cooper, 1885-1901; Malthus, 1997-2005, vol. 1, pp. 72-76, 89-98, 101-102). William Dealtry, a student at St. Catharine Hall and after that a fellow at Trinity, Cambridge, was the first professor of Mathematics at Haileybury and one of Malthus's colleagues for decades. He published *The Principles of Fluxions* (1810) that includes detailed treatment of the "problem *de maximis et minimis*" (See Harrison, 1885-1901)

Let us come to Malthus's idea of applying existing solutions to the problem to issues of political economy. The idea was not totally new, since the idea had already occurred to William Paley concerning the vexed question of luxury, an issue around which a sustained controversy had started with the Florentine humanists' deprecation in the name of civic virtue and had lasted until the end of the eighteenth century, reaching Bernard de Mandeville and Adam Smith, whose moderate stance is well-known, namely in favour of expenditure in durable goods and against that in personal services. Paley adopted too an intermediate position, but went somewhat further than Smith in defending luxury consumption. His arguments is that luxury may be either useful or dangerous to the community, since it acts

by two opposite effects; and it seems probable, that there exists a point in the scale, to which luxury may ascend, or, to which the wants of mankind may be multiplied, with advantage to the community, and beyond which the prejudicial effects begin to preponderate. The determination of this point, though it assumes the form of an arithmetical problem, depends upon circumstances too numerous, intricate, and undefined, to admit of a precise solution (Paley, 1785 [2002], pp. 597-8; cf. Waterman, 1996).

Malthus's doctrine of the "middle" was, more than reminiscence from *Nicomachean Ethics*, a more sophisticated version of Paley's idea. He writes that "many of the questions both in morals and in politics seem to be of the nature of the problems *de maximis* and *minimis* in fluxions; in which there is always a point where a certain effect is the greatest, while on either side of this point it gradually diminishes" (Malthus, 1814 [1986], p. 102); and elsewhere he contends that "all the great results in political economy, respecting wealth, depend upon *proportions*, and it is from overlooking this most important truth, that so many errors have prevailed in the prediction of consequences" (Malthus, 1820 [1989], vol. 1, p. 432), and, for example, "production and distribution are the two grand elements of wealth, which, combined in their due proportions, are capable of carrying the riches and population of the earth in non great length of time to the utmost limits of its possible resources; but which taken separately, or combined in undue proportions, produce only, after the lapse of many thousand years, the scanty riches and scanty population, which are at present scattered over the face of the globe" (*Ibid.*, p. 426). There is a point, "though we may not know how to place it, where the division of property is best suited to the actual circumstances of the society" (*Ibid.*, pp. 9-10). In 'An extract from a draft letter to an unnamed correspondent on saving and spending' he mentions a "mean" between

the two extremes of frugality and expense, which varies according to the state and natural resources of the country that tends to produce the greatest quantity of wealth in proportion to a given extent of territory (Malthus, 1998-2004, vol. 2, pp. 278-280). Even beneficial effects of moral restraint are such to a certain degree, and also in this case there is "a mean point of perfection, which it is our duty to be constantly aiming at; and the circumstance of this point being surrounded on all sides with dangers is only according to the analogy of all ethical experience (Malthus, 1810, p. 75). The unknown right proportion may be supposed – in those cases in which it has been inadvertently reached – to act as a hidden cause, promoting the progress of wealth, a cause which may be at work ubiquitously, and whose function is roughly equivalent to that of Quesnay's and Smith's "animal principle" or "*vis medicatrix*" and "in the progress of society effects may be produced by an unnoticed approximation to this middle point, which are attributed to other causes, and lead to false conclusions" (Malthus, 1820 [1989], vol. 1, p. 432). In different fields, such as saving, unproductive consumption and effective demand, the distribution of property, and obviously enough the size of population, it is not true that "what is good to a certain extent is good to any extent" (Malthus, 1803 [1989], vol. 2, p. 70; added in the 1817 edition).

The main implication of the doctrine seems accordingly to be awareness of unavoidable limits to our knowledge, since "it necessarily opens the way to differences of opinion" concerning the optimal proportions, "and thus throws a kind of uncertainty over the science of political economy" (*Ibid.*, p. 515) and this confirms political economy's "nearer resemblance to the sciences of morals and politics, than to the science of mathematics" (*Ibid.*, p. 518) and a need for "modifications, limitations and exceptions" to every "rule or proposition" (Malthus 1820 [1989], vol. 1, p. 7). In general, interventions aimed at increasing the proportion of consumption or of investment in one sector of the economy are always based on guess-work concerning the desirable proportions and will more probably be worse approximations to the golden mean than those brought about by historical circumstances, but he admits of several exceptions to non-intervention itself, justified by the same reasons, i.e. limits to our knowledge, which in general play for non-intervention. The "tendency to extremes" (Malthus, 1814 [1986], p. 352 fn) is accordingly one of the great sources of error in political economy, "where so much depends upon proportions" (*Ibid.*, vol. 2, p. 252; added in the 1836 edition).

The correspondence between Malthus and Whewell has been discussed at length (de Marchi and Sturges, 1973; James, 1979, p. 439-443; Cremaschi and Dascal, 1996, pp. 486-489) and may accordingly be mentioned briefly. After looking at Whewell's *Mathematical exposition of some doctrines of political economy* (1829), Malthus admits that he was "inclined to infer" from what he had seen, that "mathematical calculations may in some cases be introduced with advantage into the science of Political Economy" (Malthus to Whewell, May 26th 1829, in de Marchi and Sturges, 1973, p. 387), but he also adds that he fears that the greatest problem may be in "getting data to work upon, sufficiently near the truth, and such as can be stated distinctly in mathematical language" (*Ibid.*).

Anti-nominalist theory of language

Malthus's ideas on logic and language have been noted by historians of economic thought but treated almost as a matter of curiosity, one of the effects of ill-conceived over-specialization. Nonetheless, there have been a few comparatively recent contributions on Malthus and language. The first was by Christian Schmidt (1983). He believes that Malthus's research program may still be fruitful for present-day economic methodology and in more detail that his exploration of economic semantics, as contrasted with syntax, may be promising in so far as it opens a path unexplored by the four competing approaches to the relationship between syntax and semantics, namely Debreu's formalism, Samuelson's operationalism, Friedman's positivism, and Sraffa's constructivism (*Ibid.*, pp. 266-7). Malthus's stress on the practical relevance of economic language is on the one hand enlightening – in so far as Malthus has clear in mind the "practical" character of economic statements and present-day theory has tried but not succeeded in denying such practical character, in so far as it has been unable to sort out clearly positive from normative economics – and misleading – in so far as Malthus tries to convey by one word both the meaning of "positive information concerning the real world, apt to shed light on courses of action", and the meaning of a "framework apt to point out goals for action" (*Ibid.*, p. 267). Schmidt defends Malthus against Ricardo, arguing that the latter's definitions of wealth and value are in fact circular, in so far as he believes Malthus's view of the nature of economic statements to be – possibly due to Adam Smith's legacy – "pragmatic", while economic concepts need to be just "operational". Perhaps a weak point is lack of definition of what "pragmatic" means, as the term seems to refer sometimes to a usage theory of meaning and

sometimes to a normative or ethical criterion for acceptability (See *Ibid.*, pp. 258-260), and a mistaken claim is that Malthus refuses a Newtonian model of causality, "which he deems unfit to the domain of political economy" (*Ibid.*, p. 261).

Maurizio Gotti refers to Malthus's four criteria for definition, that is, usage of educated persons, authority of most celebrated writers, utility, consistency, and comments that Malthus's intuition on the strict link which exists between "the definition of a term and the particular scientific procedure which has brought it about" (Gotti 1994, p. 262) may prove fruitful; but he criticizes Malthus for his "static view" of meaning and argues that "he seems to be starting from the supposition that language is a mere representation of the objects of the world with very little space to the personal interpretation of reality" (*Ibid.*, p. 261); according to him, Malthus draws a strict relationship between a sign and its object adopting "the mono-referential principle that characterises specialized terminology typical of the exact and natural sciences and in this way he "contradicts himself, as he seems to forget the starting point of his discussion, that is, the subjectivity in the use of the terms of the moral sciences" (*Ibid.*, p. 262). An objection could be that Malthus did not simply forget his starting point and that he did not adopt a mono-referential principle, but had instead a theory of language in mind which tried to avoid naive assumptions such as that words are representations of objects, or that scientific terms bear a one-to-one correspondence with things in the extra-mental world.

Neither to Gotti nor to Schmidt the not-too-queer idea occurred of looking at the textbooks in logic and linguistics on which Malthus had apparently studied, and yet, this is what in the meantime Arthur Walzer (1987) has tried to do. His main claim is that the argument in the first *Essay* is basically rhetorical and indeed that it plays one of the rhetorician's trumps, namely relying on a prestigious paradigm, in this case Newton's. He shows how the structure of the *Essay* is such as to imitate as close as possible the *Principia* and to push Godwin and Condorcet into the same corner into which Cotes had tried to push the Cartesians. He adds that such an image of the Newtonian method was available to Malthus through Duncan's *Logick* and Cotes's Preface to the third edition. Walzer's contribution is important, and it is a lamentable fact that, being published in a journal of linguistics, it has never been quoted by historians of economic thought. What he misses yet is that the main methodological source for Malthus was MacLaurin, and that Duncan conveyed more specific contents,

those on language, definitions, real and nominal essences, that contributed to the making of Malthus's methodology.

Before proceeding to illustrate such contents, some words are in order about logic and linguistics in eighteenth-century England. In the beginning Locke started a revolution in linguistic theory as a means of excluding Aristotelian essences and granting the preconditions for the new natural philosophy. From Locke a tradition of linguistic thought originated that tried to domesticate Locke's teaching in order to preserve the mind's active role, and this tradition was still the mainstream in the last decades of the eighteenth century. Locke's theory of language was an element in his overall project of eliminating essences, the basis of Scholastic natural philosophy, supposedly tending to idle talk, and of the Renaissance philosophy of nature, providing a basis for magic doctrines. In this vein, he tried to dismantle the "Adamic" view of language, that is, a loosely Platonic doctrine starting with the assumption that there is a natural connection between words and things, then adding the conjecture that Adam was speaking the "true" original language from which historical languages derived through a process of corruption, and finally working out various projects for restoring an "Adamic language", in turn identified with Hebrew, or with some other real or imagined language (Eco, 1993; Dascal and Yakira, 1993), and of creating universal languages and reforming historically given ones in order to remedy for their imperfections with which also the "Royal Society" was concerned at the time of Newton (See Knowlson, 1975; cf. Dascal, 1982).

Two claims in Locke's third book of the *Essay* are: (i) the immediate "signification" of a speaker's words is always only "his own ideas"; (ii) species are the "workmanship" of the understanding. Both were part of his attack to Platonism and its by-products, and the first claim implies basically a return to an Aristotelian and Scholastic view of language, but the second claim, as far as it refers to classification, belongs instead in his attack on the Aristotelian worldview embedded in Scholastic natural philosophy (See Guyer, 1994). In more detail what Locke wants to say is: the imperfections of language that were the object of diagnosis and projects for improvements are incurable; certain kinds of confusion are a constant possibility, inherent in the nature of language and classification; if this fact is clearly understood some partial remedy can be found, but in matters of language perennial caution is our lot. Locke explains that obstacles to such comprehension are mistaken views on the meaning of names, and particularly of general terms (Locke, 1689, pp. 409-420). The

argument is that in nature no generality exists but it is brought about by language, and its source is our activity of classification; such activity in turn is not a discovery of fixed or unchanging Aristotelian substantial forms, or of "a certain number of Forms or Molds, wherein all natural things, that exist, are cast, and do equally partake" (*Ibid.*, p. 418), but instead a choice "from among the innumerable many similarities" (*Ibid.*, p. 415) we may observe in nature. As a mark of similarity, we need not take "secondary qualities", supposedly qualitative ones such as colour and smell, but we should rather single out more basic, "primary qualities", supposedly measurable and accordingly quantitative. We have, and perhaps will always have, only an imperfect knowledge of such qualities and, even if our knowledge could be greatly improved, we will never find an absolutely firm ground on which our classifications may be based, so that the burden of choosing which similarities to adopt as a criterion for classification cannot be removed.

Locke declares, not unlike Aristotle, that no natural connexion exists between words and things and words are signs of inner affections of the mind, but also, unlike him, that such affections are not necessarily the same for all of us, and thus the connexion they have with certain ideas is *imposed* by Men "as the Signs of their Ideas" (*Ibid.*, p. 405). And, since the function of language is communication of ideas and knowledge of things, but the meaning of words is "private", we are at constant risk that "any Word does not excite in the Hearer, the same *Idea* which it stands for in the Mind of the Speaker" (*Ibid.*, p. 476). Communicating is like sailing on such unstable punts as words may provide, for,

since Sounds have no natural connexion with our Ideas, but have all their signification from the arbitrary imposition of Men, the doubtfulness and uncertainty of their signification, which is the imperfection we here are speaking of, has its cause more in the *Ideas* they stand for, than in any incapacity there is in one Sound, more than in another, to signify any *Idea* (*Ibid.*, pp. 476-7).

Such imperfection tends to be ignored. The consequences are that people tend to ascribe to words, besides reference to our ideas, a "secret reference" to things and "often suppose their Words to stand also for the reality of Things" (*Ibid.*, p. 407) and "their Words to be marks of the ideas in the Minds also of other Men, with whom they communicate" (*Ibid.*, p. 406).

Besides overall troubles with communication, general terms bring about more troubles of their own, since they imply a voluntary imposition of meaning in

two senses: a) the connection between the word and the idea is only conventional; b) an abstract idea itself is a reflection of our own intellectual choice of important similarities among individual objects. Nature offers us similarities, but cannot tell us which ones to mark off with our abstract ideas, since "the general and universal" are not something having any real existence in things, but are instead "the Inventions and Creatures of the Understanding" (*Ibid.*, p. 414). The relationship of general terms to their reference is accordingly a tricky affair. There is a real constitution of things that is and will be – Locke believes – to a wide extent unknown. Yet this is not identical to "real essences", around which the Scholastic theory of language turned, because these are based on something we know of the deeper (non-sensible) properties of things and their use is, albeit legitimate, still based on a choice among the limited amount of similarities at the non-sensible level of which we have some knowledge. Nominal essences on the contrary are perfectly legitimate but unable to convey any information, for similarities among sensible qualities of things are infinite, and we are left free to classify things together into irrelevant clusters – precisely what Scholastic natural philosophy used to do – without any growth in information and understanding.

The conclusion is that the "imperfections" of language are unavoidable. A first group of such imperfections consists of abuses of language that require just more care by speakers. These are: (i) a tendency to use words without any clear idea of their significance at all; (ii) an inconstancy in the assignment of meaning to one's words; (iii) affected obscurity; (iv) confusion between words and things. A second group consists of abuses dependent on ignorance of Locke's own discoveries about language, including: (i) using words to talk about that of which we have no ideas, such as real essences and (ii) assuming that there must be a necessary connection between words and their meanings so that everyone must mean the same things by the same words. A third, and most damaging, group consists of imperfections inherent in the very nature of language to which we can to some extent try to find a remedy, but which we cannot completely avoid, and these are: (i) the circumstance that we cannot simply assume that we understand each other and (ii) the circumstance that general terms other than simple qualities that can be pointed at, that is, names of "mixed modes" and substances, can indeed be defined but without any "natural" criterion on whose basis we could reach agreement on definitions. The final reason for that is the difference between ideas in the minds of different individuals, as well as our

freedom – the same freedom Adam had – of imposing words on ideas. We may try to find out how other speakers use words and then conform our own usage to theirs and apply our words “to such Ideas as common use has annexed them to” (*Ibid.*, p. 514), but this is no final solution. The fact is that common usage is based on past and current beliefs and knowledge and yet knowledge advances and language needs often be improved and – what is too bad – such modifications have to be communicated through already existing language and thus some amount of uncertainty is transferred through all possible reform and – what is worst of all – even common usage is not self-evident to everybody, but has to be determined through the medium of language (*Ibid.*, p. 479).

William Duncan's *Logick* (1748), among Malthus's textbooks, was a successful popularisation of Locke's theory of language. Duncan was one of Locke's followers, but with a difference, namely he was careful in avoiding qualification of the mind as passive receptacle (see Risse, 1964-1970, vol. 2, pp. 500-501; Howell, 1971, pp. 345-361). Duncan's theory of definitions, to which ch. 6 of book I is dedicated, should be of interest to Malthus's scholars. Starting with Locke's idea of a threefold reference that words have, namely, to ideas in the mind “of him who uses them”, to ideas in the minds of “those with whom we converse” and to “things in themselves”, he declares that definitions are required in order to make known the meaning of words standing for complex ideas. Careful definitions such as those introduced by mathematicians would be of use in other parts of learning in order to prevent “all those verbal Disputes, that now so much interrupt the course of our improvement” (Duncan, 1748, p. 107). Definitions may be of different kinds: (i) those assigning a name, “teaching the connection of words and ideas” (*Ibid.*, p. 108); (ii) those of words denoting either ideas that are “new and of our own formation”, provided that they are “laid open by a Description” (*Ibid.*, p. 109), or those of words denoting “the Ideas in the Minds of other Men”; in this case they “are not arbitrary” since they fix the “meaning or acceptation” of a word “according to the common use of speech” (*Ibid.*, p. 111); (iii) those considering words as referred to things themselves, that is as “Pictures or Representations” (*Ibid.*, p. 112) expressing their “Nature and Properties”. The first and the third case are ultimately identical, since all definitions are definitions of ideas, even if the case of the triangle is different from that of gold, for, in the former case we start with intuition and in the latter with experience. Good definitions should take those simple perceptions into account which enter into the composition of the ideas and consider the

manner in which elementary ideas are combined. Needless to say, when Malthus will disagree with Ricardo about issues being matters of words or of theory, and when he will work out his own theory of definitions in economic language, insisting on a need to take actual usage by most competent speakers into account, he will give reasons in favour of his own opinions that reflect Duncan's arguments (See Malthus, 1827; cf. Cremaschi and Dascal, 1996, p. 489; 1998a, pp. 24-29 and 41-42).

Another of Malthus's textbooks was Isaac Watts's *Logick* (1725), also in Malthus's Library (See Jesus College, 1983, p. 180) and a quite influential source for eighteenth-century British linguistic theory (See Risse, 1964-1970, vol. 2, pp. 481-484; Howell, 1971, pp. 331-345). It starts with a Lockean account of perceptions and ideas, and then proceeds to discuss the nature and function of words, together with dangers carried by their use (Watts, 1725, pp. 45-70). An ideal situation would be one in which we were able to conceive of things without having recourse to words but, since this is impossible, definitions are a matter of primary concern, since we have to make use of words in conceiving things and such use may be a source of error; we should accordingly "determine precisely the Sense of our Words, which is called the definition of the Name", that in turn "may be expressed by any one or more of the Properties, Effects or Circumstances of that Object which do sufficiently distinguish it from other Objects" (*Ibid.*, p. 82), without any necessity that "we should be acquainted with the intimate essence or nature of the things" (*Ibid.*, p. 83). Practical directions are, first, to avoid mistaking words for ideas like "the Popish school-men, or the mystick Divines" (*Ibid.*, p. 84) or Aristotelians who use words "without ideas", secondly, to avoid supposing that the "Essences of things always differ from one another as much as their Names do" (*Ibid.*, p. 89), and to make definitions explicit avoiding ambiguous or equivocal terms and, thirdly, to keep close to common usage, that is,

use every Word as near as possible in the same Sense in which Mankind commonly uses it; or which Writers that have gone before you have usually affixt to it, upon condition that it is free from Ambiguity. Tho' Names are in their Original merely arbitrary, yet we should always keep to all the establish'd Meaning of them, unless great Necessity require the Alteration; for when any Word has been us'd to signify an Idea, that old Idea will recur in the Mind when the Word is heard or read, rather than any new Idea which we may fasten to it. And this is one Reason why the received Definitions of Names should be changed as little as possible (*Ibid.*, p. 97).

After definition of name, also definition of things is required, and it should be universal, proper and peculiar to the thing defined, clear and plain, short, not circular, with no tautology and no superfluous words (See *Ibid.*, pp. 105-8).

After Duncan, another eighteenth-century influential work on language that, even if it was not among Malthus's textbooks, yet is in his library (See Jesus College, 1983, p. 74) is James Harris's *Hermes or a philosophical inquiry concerning universal grammar* (1751). It is an expression of mainstream eighteenth-century English linguistic theory, concerned with saving the spiritual character of the mind against the danger of materialism. This trend reacted against Locke's alleged sceptical and materialistic implications by proving that the mind enacts an active role and thence should be assumed to have a "spiritual" nature. A search for a "universal grammar" was the program meant to give flesh and bones to such refusal of Locke's "materialism". Harris claims that in language a role is played by both nature and convention. Universal Grammar is the "analytical" part in the study of language, while Logic and Rhetoric are the "synthetical" part of this study. No wonder that the former subject is ignored, since in language causes are primary from the point of view of nature, while to human beings effects are more familiar than causes, and this is why Logic and Rhetoric are the only disciplines that have been until now cultivated. Language is a sound, not unlike the sound made by water in a fountain, but it is a sound that has a meaning, and this meaning is essential; also the voice of irrational animals has a meaning, but "whereas the meaning of those animal sounds is derived from Nature, that of the Language is derived [...] from Compact" (Harris, 1751, p. 394). We should resist the temptation to see language as a picture of the universe, for words are not images, and language is a medium made of "symbols", which in turn are based on "accidents quite arbitrary" (*Ibid.*, p. 320). This is the eventual reason why no language could ever be framed whose words could be used "as Mirrors" in order to express the properties or "real Essences" of things (*Ibid.*, p. 330); that is, words are no proper names, they are symbols of ideas and, if they are not symbols of "things without", they can only be Symbols of "something within" (*Ibid.*, p. 340-1). Language arises from a combination of *convention* and *nature*, and words are symbols of "general ideas" (*Ibid.*, p. 343), and both in *works of nature*, such as astronomical or biological phenomena, and in *works of art* such as clocks, "there are intelligible forms, which to the sensible are subsequent" (*Ibid.*, p. 379). And the practical recommendation that follows is that of sticking to ordinary language as far as

possible, since any artificial language based on conventional definitions tends to lead us astray, a recommendation the reader finds repeated in Malthus's *On Definitions in Political Economy*.

The post-Lockean tradition was challenged first in 1786 by Horne Tooke, the proponent of a reaction to Harris's semi-Platonism but also to more moderate vindications of the active role of the mind in the shape of a radically nominalist theory (See Tooke, 1786-1805; cf. Aarsleff, 1982, pp. 88-95; Robins, 1967). His work had an impact on the one hand on Jeremy Bentham and on the other on Joseph Priestley and Thomas Belsham, the fathers respectively of utilitarianism and of the Unitarian intellectual tradition. Malthus apparently had no direct knowledge of Tooke's theory, but he had access to it through Dugald Stewart's criticism. In fact, as already mentioned, at least from the second decade of the nineteenth century, Malthus appears to be acquainted with Stewart's ideas, particularly those on language, presented in writings that are in the Malthus library.

Before coming to Stewart, something should be mentioned of the Scottish tradition about language. The idea that no universal grammar is required is the basic idea in Adam Smith's *Formation of languages* (1761), namely that in the beginning was the proper name, and a language is a system derived from a bunch of proper names. A real language is generated through spontaneous emergence, by which the "general rule would establish itself insensibly, and by slow degrees, in consequence of that love of analogy and similarity of sound, which is the foundation of by far the greater part of the rules of grammar" (Smith, 1761, p. 16). An important implication is that no "universal grammar" is required, for what is needed is just some balance of simplicity and complexity in the structure of language (*Ibid.*, p. 30).

This is also the reason why Thomas Reid in his *Essay on the Intellectual Powers of Man* rules out the possibility that the method of mathematics and natural philosophy may be extended to other branches of science. He argues that in the former we define accurately the terms used and lay down, as axioms, the first principles on which reasoning is grounded, but this is not plausible in the other branches of science, where it is better to take "common acceptation" as the starting point for definitions. The reason is that definition is

nothing else but an explication of the meaning of a word, by words whose meaning is already known. Hence it is evident, that every word cannot be defined; for the

definition must consist of words; and there could be no definition, if there were not words previously understood without definition. Common words, therefore, ought to be used in their common acceptation; and, when they have different acceptations in common language; these, when it is necessary, ought to be distinguished. But they require no definition (Reid, 1785, p. 10).

Stewart's theory of language is alternative to Tooke's, compatible with the Watts-Duncan line, and much less "Platonic" than Harris's (See Stewart, 1792, pp. 197 and 282-9; 1813, pp. 5-22). The point that makes the difference between Stewart and Watts and Duncan is one item of the Scottish tradition, namely the idea that all or most words are irreducible to basic elements, and consequently no logical definition can be offered for them. Stewart, in 'On the tendency of some late Philological Speculations' (Stewart, 1810, pp. 181-227), attacked Horne Tooke's atomistic theory of meaning, or the notion that each word has a positive idea affixed to it that may be recovered by tracing the etymology of the word, and the total meaning of a sentence is the sum of meanings embedded in individual words. Stewart argues that, since Tooke's own work has proved "the metaphorical origin of by far the greater proportion of words in every cultivated language" (*Ibid.*, p. 227), instead of trying to get rid of metaphorical meaning, as Tooke perversely recommends, we should admit that words gain meaning only in context, and indeed many have no meaning at all apart from it. The implications are that – pace Reid – language cannot *mirror* thought, and our words merely supply hints to our hearers or readers, leaving most of the process of interpretation "to be performed by the Mind itself"; besides, that the intellectual act lying underneath language, is "altogether simple" and the meaning depends "on what is in the mind" of the speaker and of the listener.

There are similarities between arguments by Duncan and Watts, and even more by Stewart, and some familiar, but allegedly enigmatic, claims by Malthus. In more detail what Malthus has to say on the language of political economy comes from a shared legacy in logic and linguistic theory, or better from one well-defined trend, the eighteenth-century mainstream now under attack by the new approach launched by Tooke. In fact, one major cause of endless dispute with Ricardo was the circumstance that the latter was no Cambridge-educated Anglican gentleman for whom Locke, Watts, Duncan and Harris would have been part of a shared background, and instead, from the very beginning of his belated education which started under Thomas Belsham's inspiration, had absorbed, if any, a few ideas from Tooke's nominalist theory of language.

It is well-known how, in their controversy, Malthus criticizes Ricardo in the *Principles* for departing from "the ordinary and most correct language of society" and Ricardo on the opposite insists on strict and artificial definitions of economic terms while charging Malthus with attaching sometimes one meaning to a word and sometimes another (See Cremaschi and Dascal, 1998a). Keeping the ideas on language Malthus had absorbed and those he had explicitly formulated in mind, such disagreements and misunderstandings cannot easily be reduced to matters of "psychologies" or "casts of mind" – as Keynes liked to think – or to a more "scientific" attitude by Ricardo and hopeless confusion by Malthus as neo-Classics, Marxists, and neo-Ricardians used to believe. The disagreement with Ricardo may become less obscure in the light of Malthus's *Definitions in political economy*; a work published a few years after Ricardo's death. The occasion was the ongoing discussion on the language of science among the Oxford philosophers of the Oriel School. Malthus joined it taking advantage of Stewart's defence of the philosophy of the human mind against its critics, as a means of defending a view of political economy as a science similar to the moral and political sciences more than to the natural sciences, as the "New School", that is Ricardo's followers, seemed to understand it. He starts with a distinction between mathematics and the less strict sciences concerning the manner in which problems of language and application of terms arise. The easiest case is that of *mathematics*, which offers fewer problems, since, even if words may vary, the meaning "is always the same" (Malthus, 1827, p. 5). A more complex case is that of *natural philosophy*, where a few more problems arise, since "it is sometimes useful to say to which of two adjoining classes the individual on the confines of each ought to belong" (*Ibid*). The most complex case is that of *the sciences of morals and politics*, where one more source of complication arises, namely the circumstance that a term may be "understood differently by different persons, according to their different habits and opinions" (*Ibid*). From the above considerations Malthus draws a set of rules for definition of economic terms: (i) the sense in which terms are understood in the conversation of educated persons is "the best and more desirable authority for the meaning of words" (*Ibid*, p. 7); (ii) "the next best authority is that of some of the most celebrated writers in the science, particularly if any one of them has, by common consent, been considered as the prime founder of it" (*Ibid*); (iii) redefinition, when necessary, should be "obviously more *useful* in facilitating the explanation and improvement of the science. A change which is always itself an evil, can alone be warranted by superior utility taken in the most enlarged sense" (*Ibid*); (iv) "that any new

definitions adopted should be consistent with those which are allowed to remain, and that the same terms should always be applied in the same sense" (*Ibid.*).

As practical consequences are concerned, projects of radical reform in the language of the latter type of sciences, like the one which had been successfully carried out in chemistry, are unpractical, since "in such sciences as morals, politics, and political economy where the terms are comparatively few, and of constant application in the daily concerns of life, it is impossible to suppose that an entirely new nomenclature would be submitted to" (*Ibid.*, p. 6), and yet,

it may be observed that we shall not be able to improve the science if we are to be bound down by past authority. This is unquestionably true; and I should by no means inclined to propose to political economists '*jurare in verba magistrí*', whenever it can be clearly made out that a change would be beneficial, and decidedly contribute to the advancement of the science (*Ibid.*).

Deviations from common language may be introduced, with prudence, only for clarity's and consistency's sake (*Ibid.*, p. 7) but a generalized redefinition of economic terminology would not solve the basic problem. This is not an issue of terminology, but instead of conceptual classification. He writes:

What I consider as the main obstacle to a more general agreement among political economists, is rather the differences of opinion which have prevailed as to the classes of objects which are to be separated from each other by appropriate names, than as to the names which these classes should receive [...] It has been most justly observed by Bacon, that 'to say, where notions cannot be fitly reconciled, that there wanteth a term or nomenclature for it, is but a shift of ignorance' (Malthus, 1827, p. 106).

This may be supplemented by what he says in his correspondence with Whewell, when Malthus disagrees with him, arguing that definitions do matter and scientific definitions are a kind of hypotheses to be confirmed by the growth of knowledge. Hence "new definitions of terms" and "our advances in knowledge" – he writes – "act and react upon each other, and [...] without some understanding as to the meaning of the words used the advances in knowledge would be very slow [...] In Political Economy, subsequent to the work of Adam Smith, it might be expected that some facts had been classed which required names in order that we might refer to them, and talk of them; and what I have done chiefly has been to adhere to his meaning of these names, where he had not himself used them in a different sense" ('Malthus to Whewell', April 1st 1833, in De Marchi and Sturges, 1973, p. 393).

Political economy as a moral science

On the basis of his definition of political economy as a moral science, Malthus has been read as "unclassical" (Würgler, 1957, pp. 194-200). This is simply wrong, for Malthus both believes in a difference in method between the moral and political sciences on the one hand and mathematics and natural philosophy on the other, and shares the same basic model of the economy as a physical system as Hume, Adam Smith and Ricardo, but also believes that natural philosophy had recently made extraordinary advances, and that it was a deplorable circumstance that,

while the views of physical science are daily enlarging [...] the science of moral and political philosophy should be confined within such narrow limits, or at best be so feeble in its influence, as to be unable to counteract the increasing obstacles to human happiness arising from the principle of population (Malthus 1820 [1989], vol. 1, p. 203).

He adds that we "cannot expect that the virtue and happiness of mankind will keep pace with the brilliant career of physical discovery yet [...] hope that, to no unimportant extent, they will be influenced by its progress and will partake in its success" (*Ibid.*).

Thus Malthus apparently both believed in scientific progress, in the unity of method between the natural and the moral science, and in virtue and happiness as the object, or practical goal, of the latter, understood as some kind of unified discourse encompassing the present-day disciplines of ethics, politics, demography and economics. In principle he believed that adoption of the "Newtonian philosophy", as contrasted with the "old mode of philosophising", would have made the moral and political science a more useful discipline. He had learnt from Duncan that the same thing as was done by Newton in natural philosophy, that is "strict Demonstration" based on a *Postulatum*, starting with the "bare consideration of our Ideas", allows for necessary conclusions

in Politicks and Morality. If we form to ourselves Ideas of such Communities, Connections, Actions, and Conjectures, as do or may subsist among Mankind; all our Reasonings and Conclusions will then respect real Life, and serve as steady Maxims of Behaviour in the several Circumstances to which it is liable. It is not therefore enough that we set about the Consideration of any Ideas at random; we must further take care that those Ideas truly regard Things themselves: for although Knowledge is always certain when derived from the Contemplation of our own Ideas, yet it is then

only useful and worthy our Regard, when it respects Ideas taken from the real Objects of Nature, and strictly related to the Concerns of human Life" (Duncan, 1748, pp. 341-2)

Yet, he believed that there were peculiar difficulties of the moral and political science. Besides the mentioned passage from the first *Essay* on "friction", his awareness of the peculiar character of the moral and political science is declared in the *Principles*, where he says that the

study of the laws of nature is, in all its branches, interesting [...] but the laws which regulate the movements of human society have an infinitely stronger claim to our attention, both because they relate to objects about which we are daily and hourly conversant, and because their effects are continually modified by human interference (Malthus 1820 [1989], vol. I, p. 13).

That is, social studies on the hand have a privileged status in so far as their subject-matter is more directly accessible in principle; on the other hand access to the subject-matter is made less easy by obstacles unknown to the natural sciences. These arise from the fact that human actions are prompted by motives not so easily reducible to certain and constant causes as natural events may be. Note that the source of obstacles is no longer located, as it was for Hume, in the difficulty of "experiment" by means of introspection, for the demand to ground all social science in a science of human nature, from which, say, the branches of jurisprudence, government, and political economy should derive, had been abandoned later by Hume himself, but it lies instead in the impossibility of reducing data to mathematical figures. A lesser degree of precision is thus unavoidable in political economy where the "practical results" of "propositions" depend "upon the agency of so variable a being as man, and the qualities of so variable a compound as the soil" (*Ibid.*, p. 1). Because of such characteristics of its subject-matter, the kind of proof which can be reached in political economy cannot compete in certainty with "those which relate to figure and number" (*Ibid.*). And yet, it should be kept in mind that in both the natural and the moral domain we are inquiring into the laws of nature. He mentions "the study of the laws of nature [...] in all its branches" as including both the "physical laws", even those "by which the more distant parts of the universe are governed" and "the laws which regulate the movements of human society" and declares that what makes a difference between the two kinds of laws is the fact that the latter are "continually modified by human interference" (*Ibid.*, p. 13). This in turn results from action of other laws of nature, those governing "human nature", i.e. the

passions of men, their reason, and their self-interest and this is the reason why, while inquiring into "human society" instead of the more distant parts of the universe, we constantly face "the operations of that circle of causes and effects [...] which are acting and re-acting on each other" (*Ibid.*, p. 16), so that the effect "becomes in its turn a cause" (*Ibid.*, p. 249).

As a consequence, there are a few "great general principles" that enjoy the same certainty as "the stricter sciences", and that "resemble in most particulars the great general rules in morals and politics founded upon the known passions and propensities of human nature" (*Ibid.*, pp. 1-2) to which exceptions are to be admitted "of the most rare occurrence", and other propositions that "absolutely require limitations and exceptions" (*Ibid.*, p. 8). For example, measurement of value cannot be as precise and certain as that of length and weight because neither "the object to be measured, nor the instrument of measurement comes within the pale of that certainty which belongs to stricter sciences" (*Ibid.*, vol. 2, pp. 141-142), and not only "the physical qualities of the materials which are acted upon", but also "the moral as well as the physical qualities of the agents" (*Ibid.*, vol. 1, p. 381) should be taken into account, and it is because of such qualities that the same market mechanisms or the same policies yield different effects in different countries.

Conclusions

A reconstruction of the kind of scientific and philosophical education Malthus received provides abundant evidence to the fact that his background resulted from the Cantabrigian-Scottish tradition.

A reconstruction of the anti-nominalist theory of language he had been exposed to helps in making sense of his own views on scientific language as non-conventional language. The doctrine of proportion, an essential item in Malthus's scientific program, far from being an application of an Aristotelian ethical idea, it is a tentative application of the calculus of fluxions to economic problems, and yet it is the main reason for considering political economy as closer to the "moral" sciences than to the "stricter" sciences. Malthus believed in a similarity in principle between the natural and the moral sciences, but also in a peculiar kind of complexity of the latter sciences related to feedbacks and inherent variability in the subject-matter.

A source of confusion in previous literature may have been the fact that Malthus and Ricardo do have partially different methodological backgrounds, and these do influence their respective preferences for different kinds of arguments and techniques, but methodological programmes are after all only one out of a constellation of factors, a scientific "style", that account for what an economist actually tries to do and how he does it (See Cremaschi and Dascal, 1998b). Such a "style" yet is not displayed in a void, since any economist proceeds while facing constraints posed by empirical data, real-world policy issues, and counter-arguments. Thus, there is no solution of continuity between Malthus and Ricardo in matters of practised *method* – as opposed to methodological programs or *methodologies* – and differences in the choice of arguments and techniques fall within a spectrum where each author occupies a different position at different times according to the issue tackled with, the phase in his own evolution, the constraints posed by the opponent's objections and counter-arguments (See Cremaschi and Dascal 1998a; Dascal and Cremaschi, 1999). And yet the methodology each of them had in mind – well-documented in Malthus's case, much less in Ricardo's – results from doctrines he had absorbed through education or to which he had been exposed through conversation and reading and that he may have criticised and modified on some points, and such intellectual background may only be reconstructed, and indeed made sense of, starting with co-text, which may include rather odd sources such as those discussed in this paper.

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References

- Aarsleff, Hans (1982), *From Locke to Saussure: Essays on the Study of Language as Intellectual History*, Minneapolis (MINN): University of Minnesota Press
- Barucci, Piero (1972), 'Introduzione', in Th. Robert Malthus, *Principi*, Milan: ISEDI, pp. xi-xlvi

Cremaschi, Sergio (2010) 'Malthus's idea of a moral and political science',
The Journal of Philosophical Economics, III:2, 5-57

Bonar, James (1885 [1996]), *Malthus and his Work*, London: Cass

Bridge, Bewick (1810), *Lectures on the Elements of Algebra*, London: Cadell

Bridge, Bewick (1813), *An Introduction to the Study of the Mathematical Principles of Natural Philosophy: Intended as an Introduction to the Study of Natural Philosophy*, 2 vols, London: Cadell

Collini, Stefan, Donald Winch and John Burrow (1983), *That Noble Science of Politics. A Study in Nineteenth Century Intellectual History*, Cambridge: Cambridge University Press

Cooper, Thompson [T.C.] (1885-1901 [1959-1960]), 'Bridge, Bewick', in Stephen, Leslie and Lee Sidney (eds), *Dictionary of National Biography*, 22 vols, London: Oxford University Press, vol. 2, cols. 1222-3

Cotes, Roger (1726), 'Editoris Praefatio', reprinted in Newton, Isaac (1972), *Philosophiae Naturalis Principia Mathematica*, 2 vols, edited by A. Koyré and I. B. Cohen, Cambridge, MA: Harvard University Press

Cremaschi, S. (1981), 'Adam Smith, Newtonianism and political economy', *Manuscripto. Revista de Filosofia*, 5 (1), 117-134

Cremaschi, Sergio (1984), *Il sistema della ricchezza. Economia politica e problema del metodo in Adam Smith*, Milan: Angeli

Cremaschi, Sergio (1998), 'Malthus', in John B. Davis, D. Wade Hands, Uskali Mäki (eds), *The Handbook of Economic Methodology*, Cheltenham: Elgar, pp. 273-276

Cremaschi, Sergio (2000), 'Les Lumières Écossaises et le roman philosophique de Descartes', in Senderowicz, Yaron and Wahl, Yves (eds), *Descartes: Reception and Disenchantment*, Tel Aviv: University Publishing Projects, pp. 65-88

Cremaschi, Sergio (2002), 'Metaphors in the *Wealth of Nations*', in Boehm, Stephan, Christian Gierke, Heinz Kurz and Richard Sturm (eds), *Is There progress in economics? Knowledge, Truth and the History of Economic Thought*, Cheltenham: Elgar, pp. 89-114

Cremaschi, Sergio (2009), 'Newtonian physics, experimental moral philosophy, and the shaping of political economy', in Arena, Richard, Sheila Dow and

Cremaschi, Sergio (2010) 'Malthus's idea of a moral and political science',
The Journal of Philosophical Economics, III:2, 5-57

Matthias Klaes (eds), *Open Economics. Economics in Relation to Other Disciplines*, Oxford: Routledge, pp. 73-94

Cremaschi, S. and M. Dascal (1996), 'Malthus and Ricardo on economic methodology', *History of Political Economy*, 28 (3), 475-511

Cremaschi, S. and M. Dascal (1998a), 'Persuasion and argument in the Malthus-Ricardo correspondence', in Warren J. Samuels, Jeff E. Biddle (eds), *Research in the History of Economic Thought and Methodology*, Stanford, CO: JAI Press, vol. 16, 1-63

Cremaschi, S. and M. Dascal (1998b), 'Malthus and Ricardo: two styles for economic theory', *Science in Context*, 11 (2), 229-254

Dascal, M. (1982), 'Universal language schemes in England and France, 1600-1800 - Comments on James Knowlson', *Studia Leibnitiana*, 14 (1), 98-109

Dascal, Marcelo and Elkanah Yakira (eds) (1993), *Leibniz and Adam*, Tel Aviv: University Publishing Projects

Dascal, M. and S. Cremaschi (1999), 'The Malthus-Ricardo correspondence: sequential structure, argumentative patterns, and rationality', *Journal of Pragmatics*, 31 (9), 1129-1172

De Marchi, N.B. and R.P. Sturges (1973), 'Malthus and Ricardo's inductivist critics: four letters to William Whewell', *Economica*, 40 (3), 379-393

De Quincey, Thomas (1823), 'Malthus on the measure of value', in De Quincey (1970), *Political Economy and Politics*, New York: Kelley, 32-36

Duncan, William, *An Introduction to the Elements of Logick* (1748 [1970]), Menston: The Scholar Press

Eco, Umberto (1993), *La ricerca della lingua perfetta nella cultura europea*, Roma-Bari: Laterza; Engl. transl. (1995) *The Search for the Perfect Language*, Oxford: Blackwell

Emerson, William (1769), *A System of Astronomy, Containing the Investigation and Demonstration of the Elements of that Science*, London: John Nourse

Empson, W. (1837), 'Life, writings and character of Mr. Malthus', *Edinburgh Review*, 64 (80), 469-506

Euler, Leonhard (1744), *Methodus inveniendi lineas curvas maximi minimive proprietate gaudentes, sive solutio problematis isoperimetrici latissimo sensu accepti*, Lausanne & Genève: Bousquet, <http://www.math.dartmouth.edu/~euler/pages/E065.html>

Force, J.E. (1987), 'Hume's interest in Newton and science', *Hume Studies*, 13 (2), 166-216

Frend, William (1796-1799), *Principles of Algebra*, 2 vols., London: Robinson

Gascoigne, John (1989), *Cambridge in the Age of the Enlightenment. Science, Religion and Politics from the Restoration to the French Revolution*, Cambridge: Cambridge University Press

Gotti, Maurizio (1994), 'Malthus and the definition of economic terms', in Hart, David (ed.), *Aspects of English and Italian Lexicology and Lexicography*, Pubblicazioni del Dipartimento di Scienze del Linguaggio, Serie Ricerche, n. 10, Rome: Università 'La Sapienza', pp. 254-264

Grosholz, E. (1987), 'Some uses of proportion in Newton's Principia, book 1', *Studies in History and Philosophy of Science*, 18, 209-220

Guyer, Paul (1994), 'Locke's philosophy of language', in Vere Chappell (ed.) (1994), *The Cambridge Companion to Locke*, Cambridge: Cambridge University Press, pp. 89-115

Harris, James (1751), *Hermes or a Philosophical Inquiry concerning Universal Grammar*; reprint in (1993) *British Linguistic in the 18th Century*, vol. 2, London: Routledge - Thoemmes

Harrison, Robert [R.A.] (1885-1901 [1959-1960]), 'Dealtry, William', in Stephen, Leslie and Lee Sidney (eds), *Dictionary of National Biography*, 22 vols, London: Oxford University Press, vol. 5, col. 700

Hartwick, J.M. (1988), 'Robert Wallace and Malthus on the Rates', *History of Political Economy*, 20 (3), 357-379

Hollander, Samuel (1997), *The Economics of Thomas Robert Malthus*. Toronto: University of Toronto Press

- Howell, Wilbur S. (1971), *Eighteenth-century British Logic and Rhetoric*, Princeton: Princeton University Press
- Hume, David (1739-1740 [1998]), *A Treatise of Human Nature*, ed. by D.F. Norton and M.J. Norton, Oxford: Oxford University Press
- Hume, David (1754-1762 [1983]), *The History of England, from the Invasion of Julius Caesar to the Revolution in 1688*, 6 vols, Indianapolis: Liberty Fund
- Hume, David (1742-1752), *Essays and Treatises on Several Subjects*, reprint in Th.H. Green and Th.H. Grose (eds) (1992), *The Philosophical Works*, 4 vols., Aalen: Scientia Verlag (reprint of the 1889 ed.), vols. 3-4
- James, Patricia (1979), *Population Malthus. His Life and Time*. London: Routledge
- Jesus College (Cambridge) (1983), *The Malthus Library Catalogue*, New York: Pergamon Press
- Kambartel, Friedrich, Margarita Kranz and Matthias Schram (1971-2004), 'Proportion', in Ritter, Joachim and Karlfried Gründer (eds), *Historisches Wörterbuch der Philosophie*, 12 vols, Basel: Schwabe, vol. 7, cols 1488-1508
- Keill, John (1700 [2004]), *An introduction to Natural Philosophy*, Bristol: Thoemmes
- Kirwan, Richard (1784). *Elements of Mineralogy*, London: Elmsly
- Knowlson, James (1975), *Universal language schemes in England and France, 1600-1800*, Toronto: University of Toronto Press
- Long, Roger (1742), *Introduction to Astronomy*, 2 vols., Cambridge
- Maccabelli, Terenzio (1997), *Il progresso della ricchezza. Economia, politica e religione in Thomas Robert Malthus*, Milano: Giuffré
- McCulloch, John M.R. (1846), 'Sketch of the Life and Writings of Mr. Ricardo', reprint in McCulloch (1967), *The Treatises and Essays on Subjects Connected with Economical Policy*, New York: Kelley, 469-487
- MacLaurin, E. Colin B. (1742), *A Treatise of Fluxions*, 2 vols, Edinburgh: Ruddimans

MacLaurin, E. Colin B. (1748 [1771]), *Treatise of Algebra*, London: J. Nourse

MacLaurin, E. Colin B. (1748 [2004]), *An Account of Sir Isaac Newton's Philosophical Discoveries*. Bristol: Thoemmes

Mainzer, Klaus (1995-1996), 'Proportionenlehre', in Mittelstrass, Jürgen (ed.), *Enzyklopädie Philosophie und Wissenschaftstheorie*, Stuttgart: Metzler, vol. 3, pp. 363-364

Malthus, Th. Robert (1798). *The Principle of Population*, reprinted in Wrigley, E.A. and D. Souden (eds) (1986), *The Works of Thomas Robert Malthus*, vol. 1, London: Pickering

Malthus, Th. Robert (1803), *An Essay on the Principle of Population*, reprinted in James, Patricia (ed.) (1989), *An Essay on the Principle of Population. The Version Published in 1803, with the Variations of 1806, 1807, 1817 and 1826*, 2 vols., Cambridge: Cambridge University Press

Malthus, Th. Robert (1807), 'Letter to Samuel Whitbread Esq. M.P. on his Proposed Bill for the Amendment of the Poor Laws', reprinted in *The Works*, vol. 4, pp. 5-19

[Malthus, Th. Robert] (1810), 'Ingram's Disquisitions on Population', *Edinburgh Review*, 16 (32), 644-477

Malthus, Th. Robert (1814), 'Observations on the Effects of the Corn Laws, and of a Rise or Fall in the Price of Corn on the Agricultural and General Wealth of the Country', reprinted in *The Works*, vol. 3, pp. 87-109

Malthus, Th. Robert (1820), *Principles of Political Economy*, reprinted in Pullen, John (ed.) (1989), *Principles of political economy. Variorum edition*, 2 vols., Cambridge: Cambridge University Press

Malthus, Th. Robert (1824), 'On Political Economy', reprinted in *The Works*, vol. 4, pp. 255-297

Malthus, Th. Robert (1827), *Definitions in political economy*, reprinted in *The Works*, vol. 8

Malthus, Th. Robert (1997-2004), *The Unpublished Papers in the Collection of Kanto Gakuen University*, 2 vols., ed by Pullen, John, Cambridge: Cambridge University Press

Cremaschi, Sergio (2010) 'Malthus's idea of a moral and political science',
The Journal of Philosophical Economics, III:2, 5-57

Murdoch, John E. (1963), 'The medieval language of Proportions', in Crombie, Alistair C. (ed) (1963), *Scientific Change*, New York: Basic Books and London: Heinemann, pp. 237-271

Newton, Isaac (1704), *Opticks*, reprinted in S. Horsley (ed.) (1964) *Isaaci Newtoni Opera que extant omnia*, 5 vols., ed. by, Stuttgart-Bad Cannstatt: Fromann, vol. 4

Newton, Isaac (1726 [1972]), *Philosophiæ Naturalis Principia Mathematica*, 2 vols, ed. by Alexandre Koyré and I. Bernard Cohen, Cambridge, MA: Harvard University Press

Paglin, Morton (1961 [1973]), *Malthus and Lauderdale. The anti-Ricardian Tradition*, Clifton: Kelley

Paley, William (1785 [2002]), *The Principles of Moral and Political Philosophy*, ed. LeMahieu, D.L., Indianapolis, IN: Liberty Fund

Pullen, J.M. (1982), 'Malthus on the doctrine of proportions and the concept of the optimum', *Australian Economic Papers*, 21 (39), 270-285

Risse, Wilhelm (1964-1970), *Die Logik der Neuzeit*, 2 vols, Stuttgart: Fromann

Robins, Robert H. (1967), *A Short History of Linguistics*, London: Longman

Rutherforth, Thomas (1740), *Propositiones Mechanicæ*, Cambridge

Rutherforth, Thomas (1743), *Ordo Institutionum Physicarum*, Cambridge

Rutherforth, Thomas (1748), *A System of Natural Philosophy, Being a Course of Lectures in Mechanics, Optics, Hydrostatics, and Astronomy*, 2 vols., Cambridge

Schmidt, Ch. (1983), 'Malthus et la sémantique économique', *Revue d'Économie Politique*, 93 (2): 248-269

Smith, Adam (1761), *Considerations Concerning the First Formation of Languages*, reprinted in Wightman, W.P.D., J.C. Bryce and I.S. Ross (eds) (1980), *The Glasgow Edition of the Works and Correspondence of Adam Smith*, vol. 3, Oxford: Clarendon Press

Smith, Adam (1776) *An Inquiry into the Nature and Causes of the Wealth of Nations*, reprinted in Campbell, R.H., A. Skinner and W.B. Todd (eds) (1976),

Creemaschi, Sergio (2010) 'Malthus's idea of a moral and political science',
The Journal of Philosophical Economics, III:2, 5-57

The Glasgow Edition of the Works and Correspondence of Adam Smith, vols. 1-2, Oxford: Clarendon Press

Smith, Adam (1785), 'To George Chalmers. 10 Nov.', in Mossner, E.C. and I.S. Ross (eds) (1986), *The Glasgow Edition of the Works and Correspondence of Adam Smith*, vol. 6, Oxford: Clarendon Press, pp. 287-289

Stewart, Dugald (1792), *Elements of the Philosophy of the Human Mind*, 1, reprinted in Hamilton, W. (ed.) (1854-60 [1994]), *The Collected Works of Dugald Stewart*, Bristol: Thoemmes Press, vol. 2

Stewart, Dugald (1793), *Outlines of Moral Philosophy*, reprinted in *The Collected Works*, vols. 2, 6, 8

Stewart, Dugald (1810), *The Essays on Philosophical Subjects*, reprinted in *The Collected Works*, vol. 5

Stewart, Dugald (1813), *Elements of the Philosophy of the Human Mind*, 2, reprinted in *The Collected Works*, vol. 3

Stewart, Dugald (1815), *Dissertation First: Exhibiting the Progress of Metaphysical, Ethical, and Political Philosophy*, reprinted in *The Collected Works*, vol. 1

Tooke, Horne (1786-1805 [2002]), 2 vols, *EPEA PTEROENTA, or Diversions of Purley*, revised and corrected by Richard Harris, London: Thoemmes

Vince, Samuel (1781), *The Elements of the Conic Sections as Preparatory to the Reading of I. Newton's Principia*, Cambridge

Walzer, A.E. (1987), 'Logic and rhetoric in Malthus's *Essay on the Principle of Population*, 1798', *Quarterly Journal of Speech*, 73 (1), 1-17

Waterman, A.M.C. (1988), 'Hume, Malthus and the stability of equilibrium', *History of Political Economy*, 20 (1), 85-94

Waterman, A.M.C. (1991b), 'A Cambridge *Via Media* in late Georgian Anglicanism', reprinted in Waterman, Anthony M.C. (2004), *Political Economy and Christian Theology since the Enlightenment*, Houndsmills: Palgrave & MacMillan, pp. 71-87

Cremaschi, Sergio (2010) 'Malthus's idea of a moral and political science',
The Journal of Philosophical Economics, III:2, 5-57

Waterman, A.M.C. (1996), 'Why William Paley was "the first of the Cambridge economists"', *Cambridge Journal of Economics*, 20 (6), 673-86

Waterman, A.M.C. (1998), 'Malthus, Mathematics, and the mythology of coherence', *History of Political Economy*, 30 (4), 571-99

Waterman, Anthony M.C. (1991a), *Revolution, Economics and Religion. Christian Political Economy, 1798-1833*. Cambridge: Cambridge University Press

Watts, Isaac (1725 [1984]), *Logick: or, The Right Use of Reason*, New York: Garland

Watts, Isaac (1741), *The Improvement of the Mind*, reprinted in (1999) *Selected Works of Isaac Watts*, Bristol: Thoemmes, vols. 7-8

Whewell, William (1829), *Mathematical Exposition of Some Doctrines of Political Economy*, in (1968), *On the Mathematical Exposition of Some Doctrines of Political Economy*, Farnborough: Gregg

Winch, Donald (1987), *Malthus*, Oxford: Oxford University Press

Wrigley, Edward A. (1986), 'Introduction', in *The Works of Thomas Robert Malthus*, vol. 1, pp. 7-39

Würgler, Hans (1957), *Malthus als Kritiker der Klassik. Ein Beitrag zur Geschichte der klassischen Wirtschaftstheorie*, Winterthur: Keller

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