

# The Scottish Enlightenment and Descartes's philosophical novel\*

Sergio Cremaschi

## 1. Scottish Newtonianism

During the first half of the eighteenth century, Newton's work became the emblem of the "new philosophy" all over Europe. It provided a model to be followed in every field, and the *divide* between the friends and the enemies of Reason. Reasons for such a sanctification of Newton are to be found primarily in the end, due to the competitor's disappearance, of the polemics against Aristotelianism, which with its sequel of occult qualities and substantial forms had provided seventeenth century philosophers an excellent straw-man. Secondly, they are to be found in the birth of a controversy between Cartesians and Newtonians. This controversy will grow with a snow-ball effect, starting with a purely scientific issue, namely the theory of vortices, coming to include two overall views of scientific method and two distinct theories of knowledge. Thus, at the very interest in attacking Aristotle vanished, as Aristotelianism ceased being perceived as a real danger, the villain became Descartes, the author of an "illusive philosophy" or of "one of the most entertaining romances that have ever been wrote".

The Scottish Enlighteners were those who made the most of Newton's legacy, since (i) they most firmly believed in the need to apply the Newtonian method to every field, not only to natural philosophy, but also to a restructuring of practical philosophy which should yield the (never launched) new science of natural jurisprudence, and (ii) they had the strongest reasons to contrast Newton with Descartes, since the Scots' Newtonianism was not the Platonic Newtonianism of Cambridge physico-theologians, but an experimental and even (ironic as this may be) anti-mathematical Newtonian tradition (partly imported from the Netherlands)

Let me add a few words on the first point, i.e., the idea of a Moral Newtonianism. Cartesianism,

---

\* Paper presented at the Conference: 'Descartes. Réception and Déception', Tel-Aviv 1-3 January 1997 and published in a French version as 'Les Lumières Écossaises et le roman philosophique de Descartes', in Y. Senderowicz and Y. Wahl (eds), *Descartes: Reception and Disenchantment*, Tel Aviv: University Publishing Projects, 2000, pp. 65-88.

and the Cartesian theory of vortices was for them the emblem of aprioristic rationalism; what mattered for them was artificialism in politics, such as could be found in Locke's contractarian theory, and their project was a renewed natural law theory, that could be at once both an empirical evolutionary science of society and a guide for action for the 'man of government'<sup>1</sup>.

Let me add a few words on the second point), i.e., the experimentalist interpretation of Newtonianism on which the project of a moral Newtonianism was based. The tradition of empiricist Newtonianism prevailing in Scotland derived from inter-breeding of two different currents. The first was the scientific Newtonianism of the Oxford-Edinburgh and school including David Gregory, John Keill, John Freind, very influential in Edinburgh in the first three decades of the eighteenth century. This school was very anti-Cartesian, it proclaimed an absolute refusal of hypotheses, while insisting on mathematization of scientific laws and excluding the existence of attractive or repulsive forces inherent to material particles, making such forces directly dependent on the Creator, and finally emphasized the absolute nature of space and time. Since 1728, the year Henry Pemberton's *View of Sir Isaac Newton's Philosophy* was published, the influence of another current started being felt. This school derived from the work of Willelm 'sGravesande and other Dutch Newtonians as well as Henry Pemberton who stressed the Baconian character of Newtonian methodology and its experimental nature incompatible with any metaphysical interpretation of Newton's work. This current apparently rescued a Hobbesian idea, as it stressed the difference between pure and applied mathematics: since mathematical principles are "within us", while physical principles are outside us, pure mathematics is a kind of *certain* knowledge, since the objects of our knowledge are also created by ourselves, while physics is a kind of *uncertain* knowledge, always implying unknown external substances at work in our subject matter. The principles of mathematical physics, being unable to *mirror* true physical principles at work behind the phenomena, are mere *tools* for explanation<sup>2</sup>. Colin MacLaurin, whose work started circulating after 1728, was inspired mainly by the first school and provided the main source on Newtonian for Hume, Smith and Ferguson.

## **2. The image of Descartes as the Anti-Newton**

What the Scots had to say on Descartes may be summarized in ten claims as follows:

TABLE I: **The Scottish philosophers' claims concerning Cartesianism**

- 
- A. Better Descartes than Aristotelianism
  - B. Conjectures are a Bad Thing and the theory of Vortices is the most unjustified conjecture that was ever made
  - C. "Systems" are an arbitrary blend of truth and error prompted by excessive love of simplification
  - D. Self-deceit is the reason for the success of the Cartesian system, as it satisfies needs of human imagination such as presumption, love of analogy and a tendency to oversimplification.
  - E. Contempt for observation was the main defect of Cartesian physics.
  - F. Universal Doubt and the Cogito are unacceptable
  - G. The trunk in the tree of knowledge is the philosophy of mind, not physics.
  - H. *Hypotheses non fingo* = causes are unknowable
  - I. The distinction between primary and secondary qualities is unjustified
  - L. Reflexion is the right path to the study of the mind, not analogy with matter (and Descartes was right on this point)
- 

It may be remarked that the common denominator among the Scots is reduced to very little, including the preference for Descartes vis-à-vis Aristotelianism and the refusal of the theory of vortices as the worst example of "system". Note also that Hume adds to what MacLaurin had said theses with a more 'philosophical' character, and Reid abandons much of what his three predecessors had said, while adding much that is new. In the following table, I crossed out the presence in an author of one of the claims included in the above list, by a star when it is his main claim, and its negation by a minus sign .

TABLE II: **Presence and absence of claims on Cartesianism**

	A	B	C	D	E	F	G	H	I	L
MacLaurin		+	*	+	+	+				
Hume					+		+	+	*	
Smith		+	+	+	*	+		+	+	
Reid		+	+				*		+	*
Ferguson		*		+	*		-			
Stewart		+						+	+	+

### 3. Colin Maclaurin

The leading figure of the Scottish scientific Newtonianism was Colin MacLaurin, a mathematician and the author of *An Account of Sir Isaac Newton's Philosophical Discoveries*. This book is a presentation of Newton's work (confined to the *Principia*) belonging to the genre of Pemberton's and Voltaire's books, but with a remarkably higher quality. This work provided a

background to the Scottish enlighteners, Hume included, since it was completed by 1728 and circulated in manuscript (even though it was published in 1748). A remarkable fact about the *Account* is that it includes, in chapter 2 of book I, a short history of natural philosophy from ancient times to Descartes and his followers (within which also Leibniz is included).

### ***A. Better Descartes than Aristotelianism***

MacLaurin's Newton has (no less than Hume's Cleanthes) two opposed enemies: on the hand dogmatic theologians and Aristotelians, on the other, Cartesians. He declares that "interests" of true religion are not "advanced by feigning philosophical systems purposely to favour it" (MacLaurin 1748: 6). On the opposite, an "entire liberty must be allowed in our enquiries" (6). But, on the opposite side, "we ought not to abuse this liberty by *supposing* instead of *inquiring*, and by imagining systems instead of learning from observation and experience the true constitution of things" (7). In the middle ages, the times of the universally abhorred scholastic philosophy, the "disputes among the sects [...] produced a talkative sort of philosophy" (*Ib.*). But, on the opposite side, these disputes have proved less dangerous than "that pride and ambition" which has led philosophers to produce hastily "a compleat and finished system of nature", and in order to round up such a system, to invent "certain principles and hypotheses" (*Ib.*), from which they pretend to explain all the mysteries of nature.

The *Cartesian* system was the most extensive, and (according to many) the most exquisite in its contrivance, of any that have been imagined. The author of it was a bold philosopher, and doubtless of a subtle genius [...] is allowed to have contributed to dissipate the darkness of that sort of science which prevailed in the schools (*Ib.*:63)

Newton's opponents "pretended to find a resemblance between his doctrines and the exploded tenets of the scholastic philosophy [...] treating gravity as an occult quality, because he did not pretend to deduce this principle fully from its cause" (10). Let us note, in this connection, one of the first occurrences of the term metaphysics in an almost modern (post-Kantian) sense. Maclaurin notes that "Newton [...] would admit no objections against plain experience from metaphysical consideration" (8).

### **B. Against Conjectures and the theory of Vortices**

According to MacLaurin, Descartes, starting with universal doubt and arguing the existence of God and matter, "from the knowledge of the cause established in this manner, he pretends to deduce a complete knowledge of his effects" (64). From the notions of extension and motion he argued his theory of "vortices" from which the phenomena of gravity as well as those of the magnet were deduced. In short, "He pretended [...] to account for every thing in nature, from the same principles" (67). "There was never, perhaps, a more extravagant undertaking than such an attempt to deduce, by necessary consequences, the whole fabric of nature [...] from any ideas we are able to form of an infinitely perfect Being" (68). As a consequence, Descartes was right in calling his system his philosophical romance; it is in fact "a rhapsody" or a "visionary claim" (*Ib.*). "Should we allow the principles he builds on, and his method, it must be obvious with how weak an evidence the consequences are connected with each other" (*Ib.*). "If we may believe some accounts, he rejected a void from a complaisance to the taste which then prevailed, against his own first sentiments, and amongst his familiar friends, used to call his system his philosophical romance" (63)

### **C. Against Systems and oversimplification**

Maclaurin thus lists Descartes among those who "have pretended to explain the whole constitution of things by what they call clear ideas, and by mere abstract speculations... they set out from the *first cause*; and from their ideas" of this cause "pretend to unfold the whole claim, and to trace a complete scheme of his works" (10). In this connection MacLaurin quotes Descartes:

*Perspicuum et optimam philosophandi viam nos sequuturos si, ex ipsius Dei cognitione, rerum ab eo creatarum explixationem deducere conemur, ut ita scientiam perspectissimam que est effectuum per causas, acquiramus*  
(Descartes 1647, II, § 22)

and adds that Descartes "afterwards, having occasion to speak of the phenomena [...] takes care to tell us, that he would not make use of them to prove any thing from them, because he wanted to derive the knowledge of effects from their causes, and reciprocally that of the causes from their effects" (10) and to this effect he quotes again Descartes (1647, III, § 4ff).

#### **D. Deceit is the reason for the success of the Cartesian system**

MacLaurin admits that "Speculative men, by the force of genius, may invent systems that will perhaps be greatly admired for a time" (6). This is because the "real state of things", even if it presents itself to us, is rejected as fiction, or we are apt "by new efforts of vain ingenuity, to interweave it with our own conceits. Thus, by blending together parts so ill suited, the whole comes forth an absurd composition of truth and error"; these however are phantoms which the force of truth will sooner or later dispell: and while we are pleas'd with the deceit, true philosophy [...] suffers" (6-7).

#### **E. Contempt for observation was the main defect of Cartesian physics**

Commenting on Galileo, MacLaurin says that Descartes (in *Epistola* 91) "complains that he had not examined things in order [...] he had built without a foundation. He did not, 'tis true, take so high a flight as *Des Cartes*, or attempt so universal a system" (55); but he adds that "this complaint, I doubt, must turn out to Galileo's praise; while the censure of *Des Cartes* shews that he had the weakness to be vain of the worst part of his writings" (*Ib.*)

#### **F. Universal Doubt and the Cogito are untenable**

The role of universal doubt in Descartes's system is taken note of cursorily, just in order to show how heavily the system relied on deduction and mono-causality: "From the knowledge of the cause established in this manner, he pretends to deduce a complete knowledge of his effects" (64); this amounts to saying that Cartesian doubt is of interest to MacLaurin just in order to prove up to what point the Cartesian System was resting on deduction and monocausality.

### **4. David Hume**

Hume's *Treatise of Human Nature* precipitated various eighteenth century commonplaces, such as atomism, universal attraction, force, and the dismissal of hypotheses into an original new synthesis, namely the project of a science of man, as the new basis not only for moral philosophy, but for natural philosophy too (Hume 1739-40: Intro). The project was too original

to be understood and appreciated by contemporaries. An historiographic revision has rescued Hume's project from the twin *damnatio capitis* as a follower of scepticism or as a forerunner of analytic philosophy; his project was that of a "science of human nature" as the new first philosophy, meant to provide a basis for every branch of knowledge, and founded on the analytico-synthetic method, following a basic analogy between the moral world and the physical as depicted in Newton's system (See Noxon 1973: 27-123; Cremaschi 1992). The new science of man, in its role of first philosophy was expected to provide the basis not just for moral philosophy but also for "mathematics, natural philosophy and natural religion" (Hume 1739-40: xix). The Humean project provided a source of inspiration for other Scottish philosophers, namely Adam Smith and Adam Ferguson as well as, to a point, also Dugald Stewart.

#### **A. *Better Descartes than Aristotelianism***

Since Hume was planning to apply Newton's achievements to new fields, one would expect that his appraisal of Newton in his work should be a highly positive one and that of Descartes drastically negative. Instead, his judgment is rather nuanced but he shares Maclaurin's idea that Cartesianism, and the "meckanical philosophy" as a whole, did contribute in dissipating darkness reigning in the Middle Ages.

#### **D. *Deceit is the reason for the success of the Cartesian system***

In *Of the rise and progress of the Arts and Sciences* Hume writes that "what checked the progress of the Cartesian philosophy, to which the French nation shewed such a strong propensity towards the end of the century" (Hume 1748a: 183) was "the opposition made to it by the other nations of Europe, who soon discovered the weak sides of that philosophy" (*Ib.*). But he continues with the non-committal consideration that also Newton's theory has undergone severe criticism only outside Britain.

And in the book 6, ch. 71 of the *History of England* he adds a cryptic remark on Newton and the mechanical philosophy. The latter is

a theory which, by discovering some of the secrets of nature, and allowing us to imagine the rest, is so agreeable to the natural vanity and curiosity of men [...] While Newton *seemed* to draw off the veil from some of the mysteries of

nature, he showed at the same time the *imperfections* of the mechanical philosophy; and thereby restored her ultimate *secrets* to that obscurity in which they ever did and ever will remain (Hume 1754-62, 6: 329).

### ***F. Universal doubt and the cogito are untenable***

In the First *Enquiry* Hume writes that

there is a species of scepticism, *antecedent* to all study and philosophy, which is very much inculcated by Des Cartes and others, as a sovereign preservative against error and precipitate judgment [...] we must assure ourselves, by a chain of reasoning deduced from some original principle, which cannot possibly be fallacious or deceitful. But neither is there any such original principle [...] Or, if there were, could it advance a step beyond it, but by the use of those very faculties, of which we are supposed to be already diffident, The Cartesian doubt, therefore, were it ever possible to be attended by any human creature[...] would be entirely incurable (Hume 1748b: 122-23)

And he had already declared in the *Treatise* that “Scepticism is a malady, which can never be radically cured” (Hume 1739-40: 218).

### ***G. The trunk in the tree of knowledge is the philosophy of mind, not physics.***

Hume in the Introduction to the *Treatise* presents, without ever mentioning Descartes, a design of the tree of knowledge as made of roots that are the science of human nature, not metaphysics, of a trunk that is the empirical sciences, not physics. This is almost a paraphrasis turned upside down of what Descartes had written on this point in the *Principia*. Philosophy, Descartes writes

is like a tree whose roots are metaphysics, whose trunk is physics, and whose branches, which arise from this trunk, are all other sciences, which may be reduced to three main ones, namely medicine, mechanics and morality (Descartes 1647: 14).

For Hume the trunk is no more physics, but the science of human nature. He writes:

All the sciences have a relation, greater or less, to human nature; and, however wide any of them may seem to run from it, they still return back by one passage or another [...] In pretending therefore to explain the principles of human nature, we in effect propose a complete system of the sciences, built on a foundation almost entirely new, and the only one upon which they can stand with any security. (Hume



### **H. *Hypotheses non fingo = causes are unknowable***

In the First *Enquiry*, sect. 7 "Of the idea of necessary connection" Hume declares that it is no less mysterious how motion may arise from impulse than how it may arise from volition: he adds that the *vis inertiae* which is so much talked about in the new philosophy is just an expression summarizing a few facts

without pretending to have any idea of the inert power; in the same manner as, where we talk of gravity, we mean certain effects without comprehending that active power; in the same manner as, when we talk of gravity, we mean certain effects without comprehending that active power. It was never the meaning of Sir Isaac Newton to rob second causes of all force or energy; though some of his followers have endeavoured to establish that theory upon his authority [...] that *great philosopher* had recourse to an ethereal active fluid to explain his universal attraction; though he was so cautious and modest as to allow, that it was a mere hypothesis not to be insisted on, without more experiments (Hume 1748b: 61).

He also notes that Descartes insinuated that doctrine of the universal and sole efficacy of the Deity, without insisting on it. Malebranche and other Cartesians made it the foundation of all their philosophy (*Ib.*)

### **5. Adam Smith**

The work of Adam Smith, the author of *The Wealth of Nations*, is now recognized to be a typical result of Scots' attempt to build a new moral science following Hume's design of some kind of moral Newtonianism. The "system of wealth" presented by him in the mentioned work was in his intentions one chapter of this project<sup>4</sup>, by his 'philosophical' essays he contributed to the argument on the significance and validity of the Newtonian achievement, while his ethics and natural jurisprudence were parts of the Scottish enlighteners' grand design of a new science resulting from the restructuring of practical philosophy through the Newtonian method<sup>5</sup>.

### **A. *Better Descartes than Aristotelianism***

In the "Letter to the Edinburgh Review", Smith acknowledges to Cartesian physics precisely the same merits MacLaurin had granted it, that is to say, the fact of being slightly less meaningless than Aristotelian physics. He writes that "The Meditations of Des Cartes excepted, I know nothing in French that aims at being original" (Smith 1756: 10) in natural philosophy, morals, metaphysics, and the abstract sciences. In particular, in 'natural philosophy[...] France has scarce produced any thing very considerable', except 'a fanciful, an ingenious and elegant, tho' fallacious, system was generally embraced in that country [...] the Cartesian philosophy' (*Ib.*). Although it 'is almost universally exploded [...] in the simplicity, precision and perspicuity of its principles and conclusions, it had the same superiority over the peripatetic system, which the Newtonian philosophy has over it' (*Ib.*). And, while it 'was regarded by the French with peculiar fondness and admiration, when they considered it as the production of their own countryman' (*Ib.*), yet, at the time Smith is writing, they seem 'to be pretty generally disengaged from the enchantment of that illusive philosophy' (*Ib.*).

### **B. *Against vortices and conjectures***

The main claim in the 'History of Astronomy' is that theories are "imaginary machines" built behind the scenes of the world-theatre; as those who have been admitted behind the scenes are no more surprised by the wonders of the opera-house, so mankind is no more surprised when faced with phenomena like eclipses, as soon as it has discovered what lies behind. Yet, there are cases for which no such explanation has been reached. In those cases "even the vague hypotheses of Des Cartes, and the yet more indetermined notions of Aristotle" (Smith 1795a II.10) are able to give the phenomena some coherence.

On such criteria, Descartes's natural philosophy should look less plausible than Newton's. Smith mentions the fact that *Descartes* did never apply himself to observation of the heavens and appears to have built his own theory without paying any attention at all to 'those alterations which Kepler had made' (Smith 1795a IV.55) in the Copernican system.

Yet, the Cartesian theory of vortices had the great merit of trying to render the idea of the rapid motions of the enormous bodies of the planets (an idea contrasting with habit) familiar to our imagination by introducing an 'invisible chain' connecting disjoined phenomena.

Des Cartes was the first who attempted to account for the planets' movement by ascertaining precisely wherein this invisible chain consisted, and to afford the imagination a train of intermediate events, which [...] should unite those incoherent qualities, the rapid motion, and the natural inertness of the Planets [...] Des Cartes was the first who explained wherein consisted the real inertness of matter [...] a power of continuing indifferently either at rest or in motion [...] (Smith 1795a IV.61).

The very familiar idea of impulse was used to obtain this result. For "that ingenious and fanciful philosopher all the infinite space is full with matter [...] there could be no void" (61), and the theory of vortices is made conceivable precisely by this assumption.

It was thus, that Des Cartes endeavoured to render familiar to the imagination, the greatest difficulty in the Copernican system, the rapid motion of the enormous bodies of the Planets [...] This account, too, of the motions of the Heavens, was connected with a vast, an immense system, which joined together a greater number of the most discordant phenomena of nature, than had been united by any other hypothesis; a system where the principles of connection though, perhaps equally imaginary, were, however, more distinct and determinate, than any that had been known before (Smith 1795a IV.65)

The Cartesian philosophy is almost universally rejected, while the Copernican system continues to be universally received, and yet,

it is not easy to imagine how much probability and coherence this admired system was long supposed to derive from that exploded hypothesis [...] when the world beheld that complete, and almost perfect coherence, which the philosophy of Des Cartes bestowed upon the system of Copernicus, the imaginations of mankind could no longer refuse themselves the pleasure of going along with so harmonious an account of things (*Ib.*).

#### ***D. Deceit is the reason for the Cartesian system's success***

What Smith calls the "Newtonian" method in 'didactic discourse' (i.e. scientific discourse) is contrasted by him with the other method one may adopt in such kind of discourse, namely the Aristotelian method. The Newtonian method consists in introducing as few principles as possible, and explaining as many phenomena as it is possible from these principles. It is 'vastly more ingenious' than the former in so far as it consists in making the phenomena 'which we reckoned the most unaccountable, all deduced from some principle [...] and all united in one chain [...] [and this] gives us a pleasure [...] We need not be surprised, then, that the Cartesian

philosophy (for Descartes was in reality the first who attempted this method), though it does not perhaps contain a word of truth [...] should nevertheless have been so universally received by all the learned in Europe at that time' (Smith 1963 II.134-5), even though at Smith's time, it is justly esteemed to be 'one of the most entertaining romances that have ever been wrote' (*Ib.* II.134-5). Also in the *Theory of Moral Sentiments*, when explaining why a false system like Mandeville's could not have been accepted unless it contained at least a bit of truth, he compares it with Descartes's theory of vortices. He writes that the

vortices of Des Cartes were regarded by a very ingenious nation, for near a century together, as a most satisfactory account of the revolutions of the heavenly bodies. Yet it has been demonstrated, to the conviction of all mankind, that these pretended causes of those wonderful effects, not only do not actually exist, but are utterly impossible, and if they did exist, could produce no such effects as are ascribed to them (Smith 1759 VII.ii.4.13).

The reason for that is – he adds – that the physical world, as contrasted with the moral, is unknown to us in its essence, and theories about this world are like accounts of some distant country given by a traveller who 'may impose upon our credulity the most groundless and absurd fictions as the most certain matters of fact' (*Ib.*).

### ***E. Contempt of observation was the main vice in Cartesian physics***

The main difficulty in the Cartesian system derived from the fact that it accounted only for the fundamental motions of the heavenly bodies, leaving irregularities aside. Even though Descartes

was not ignorant [...] of any of the observations which had been made before his time, he seems to have paid them no great degree of attention [...] So far, therefore, from accommodating his system to all the minute irregularities, which Kepler had ascertained in the movements of the Planets [...] he contented himself with observing that perfect uniformity could not be expected in their motions (*Ib.* iv.66).

By this remark, he believed to be relieved 'from the necessity of applying his system to the observations of Kepler, and the other Astronomers" (*Ib.* IV.66). But when the observations of Cassini had established the authority of those laws, which Kepler had first discovered in the system, 'the philosophy of Des Cartes, which could afford no reason, why such particular laws should be observed, might continue to amuse the learned in other sciences, but could no longer

satisfy those that were skilled in astronomy' (*Ib.* IV.67).

#### **H. *Hypotheses non fingo = Causes are unknowable***

Descartes' theory of vortices and Newton's theory of universal gravitation are two different attempts to complete the Copernican system by providing a cause for the motions of the planets. The Newtonian theory was a response to the inadequacy of the theory of vortices. Newton 'first attempted to give a physical account of the motions of the Planets, which should accommodate itself to all the constant irregularities which astronomers had ever observed in their motions' (*Ib.* IV.67). Newton's "superior genius and sagacity" yielded the 'greatest and most admirable improvement that was ever made in philosophy, when he discovered that he could join together the movements of the Planets by so familiar a principle of connection' (*Ib.*) as gravity, a quality of matter no less familiar than its inertness of matter, the quality from which the laws of impulse flow, by which "Des Cartes had endeavoured to bind together the movements of Planets" (*Ib.*). And, as the same hypothesis covers also observed irregularities in the heavenly motions, the Newtonian theory complies with the requirements of the imagination to such an extent that we are irresistibly drawn to conceive of it as the 'true' theory, or to believe we have been admitted 'behind the scenes' (*Ib.*, iv.76) in the theatre of nature.

His principles, it must be acknowledged, have a degree of firmness and solidity that we should in vain look for in any other system [...] And even we, while we have been endeavouring to represent all philosophical systems as mere inventions of the imagination, to connect together the otherwise disjointed and discordant phaenomena of nature, have insensibly been drawn in, to make use of language expressing the connecting principles of this one, as if they were the real chains which Nature makes use of to bind together her several operations (*Ib.*).

A comparison with Hume's quote from the *History of England* is in order: Hume uses the verb *to seem* while talking of Newton's lifting the veil of Nature. Smith states that the function of a theory is, strictly, that of imposing an order on the chaos of phenomena, but that the human imagination perceives its own conceptual construction as if it was the discovery of the "true cause", hidden behind the veil of phenomena.

#### **L. *The distinction between primary and secondary qualities is unjustified***

The four qualities of extension, divisibility, figure, and mobility are inseparable from the idea of solid substance. It would however be rash to conclude that the solid substance can, as such, possess, no other qualities or attributes. 'This very rash conclusion, notwithstanding, has been not only drawn, but insisted upon, as an axiom of the most indubitable certainty, by philosophers of very eminent reputation' (Smith 1795b 13).

## **6. Thomas Reid**

Thomas Reid, Hume's critic and the arch-enemy of scepticism, who was at the root of that second stage in the evolution (or involution) of Scottish philosophy which goes under the name of common sense philosophy, abandoning his predecessors' encyclopaedism, chose the philosophy of mind as the basic discipline while taking a step in the direction of separation of 'philosophy' from science<sup>6</sup>. In his argumentative strategy, a reconstruction of the image of Descartes on the basis of his predecessors' criticism is worth attention, both for its importance in his writings and for the extremely nuanced tactics that, while keeping almost everything from Smith's, MacLaurin's and even Hume's criticism to Descartes, and at the same time almost everything is twisted into an opposite direction.

### ***A. Better Descartes than Aristotelianism***

Reid repeats once more the commonplace that Cartesian natural philosophy had been indeed a step beyond Aristotelianism, that the 'great revolution which Des Cartes produced in philosophy, was the effect of a superiority of genius, aided by the circumstances of the time' (Reid 1785: 268). And to this Reid adds a praise to Descartes which goes far beyond MacLaurin's, Hume's, and Smith's acknowledgements. He adds that the 'merit of Des Cartes cannot be easily conceived by those who have not some notion of the Peripatetic system, in which he was educated. To throw off the prejudices of education [...] required an uncommon force of mind' (*Ib.*, 269)

And, even though the true importance of Descartes's philosophy lies in the fact of clearly distinguishing between the material world and the intellectual, thus paving the way for future advances in philosophy of mind, in physics he "was less successful", even though the natural

philosophy of Descartes played a role in eliminating prejudices. In fact, as a result of the "spreading of the Cartesian system, *materia prima*, substantial forms, and occult qualities, with all the jargon of Aristotelian physics, fell into utter disgrace [...] as a subject of ridicule" (*Ib.*: 271).

### ***B. Against Vortices and Conjectures***

But Reid is no less harsh than its predecessors had been when it comes to conjectures, the point on which he is more anti-Cartesian and the proponent of a kind of extreme inductivism, far from the constructivist epistemology professed by Smith. He writes:

Conjectures and theories are the creatures of men, and will always be found very unlike the creatures of God. If we would know the works of God, we must consult themselves with attention and humility, without daring to add anything of ours to what they declare. A just interpretation of nature is the only sound and orthodox philosophy: whatever we add of our own is apocryphal, and of no authority. All our curious theories of the formation of the earth, of the generation of animals, of the origin of natural and moral evil, so far as they go beyond a just induction from facts, are vanity and folly, no less than the Vortices of Des Cartes (Reid 1764: 97-98).

He adds that Descartes's main mistake was falling into the extreme opposite to the Aristotelian one, pretending to explain everything by extension, figure and motion, without paying the price of a long and painful observations of nature. In fact,

all that we can know of the material system must be derived from what can be discovered by our senses. Des Cartes was not ignorant of this [...] He made many experiments[...] but [...] he thought that, from a few experiments, he might be able to discover the simplest way in which the obvious phaenomena of nature can be produced by matter and motion only [...] His conjectures[...] are to be found so far from the truth, that they ought for ever to discourage philosophers from trusting to conjecture in the operations of nature [...] The vortices [...] are now found to be fictions, no less than the sensible species of Aristotle (Reid 1785: 271)

### ***C. Against systems and oversimplification***

While Reid sympathizes with Smith with regard to Descartes's philosophy as a whole, and tries as much as he can to be charitable even about his natural philosophy (which he believes to be mistaken), nonetheless he agrees with Smith in accounting for the causes of Cartesian natural

philosophy's shortcomings. That is to say, Descartes was led astray by an excessive love for simplicity. Once the Cartesians had won over the obscure notions of Aristotelian philosophy, enthusiasm was so great that they went too far in an opposite direction, and that "men should rush with violence from one extreme, without going more or less into the contrary extreme, is not to be expected from the weakness of human nature. Des Cartes and his followers were not exempted from this weakness; they thought that extension, figure, and motion, were sufficient to resolve all the phaenomena of the material world" (Reid 1785: 271). This is why they refused to admit such an entity as gravitation, since it "seemed an occult quality" (*Ib.*), while instead it is only an entity whose cause we ignore, and the best attitude for a philosopher is to be ready to make "confession of human ignorance" (*Ib.*: 271) is.

A similar idea, echoing very much Adam Smith's attitude, is repeated in the Conclusion of the *Inquiry on the Human Mind*. Reid writes:

There is a disposition in human nature to reduce things to as few principles as possible; and this, without doubt, adds to the beauty of the system [...] This love of simplicity [...] has produced many a false system, but there never was any system in which it appears so remarkably as that of Des Cartes (Reid 1764: 206).

It should be noted, yet, that, even though words are almost the same as those used by Smith (note that we have no answer to the question whether Reid had been able to read Smith's *Essays on Philosophical Subjects* before their publication in 1795), here the consequences drawn are somewhat different: what is at stake here is not universal gravitation and occult qualities in natural philosophy but instead the experimental basis for the philosophy of mind (the area in which, according to Reid, Descartes gave a valuable contribution); Reid criticism here is that of having made his whole doctrine dependent on a single axiom, 'expressed by the word *cogito*' (*Ib.*). A truly experimental attitude would have required that one should not build a whole theory on so restricted a basis. "The love of simplicity so natural to the mind of man, led him to apply the whole force of his mind to raise the fabric of knowledge upon this one principle, rather than to seek a broader foundation" (Reid 1785: 269)

#### **F. *Universal doubt and the cogito are untenable***

Descartes's way out scepticism, i.e., the *cogito*, is an elusive one; it suffers from excessive love



of simplicity, and the system based on so restricted a basis contains already scepticism in itself as its eventual consequence, a consequence that Hume was consistent enough to draw. Reid writes that Descartes

resolved not to believe his own existence till he should be able to give a good reason for it [...] There may be disorders in the human frame that may produce such extravagancies, but they will never be cured by reasoning. Des Cartes, indeed, would make us believe that he got out of this delirium by this logical argument, *Cogito, ergo sum*; but it is evident that he was in his senses all the time, and never seriously doubted of his existence" (Reid 1764: 100).

### ***I. Reflexion against analogy and methodological dualism***

It has already been mentioned that, according to Reid, the part of the Cartesian system which has borne fruit is the philosophy of the mind, and its main achievement is having established a clear boundary between matter and spirit. Concerning the former, the positive result was damning obscure Peripatetic notions to oblivion, that is, with 'regard to physics or the philosophy of body, if Des Cartes had not the merit of leading men into the right tract, we must allow him that of bringing them out of a wrong one" (Reid 1785: 270). Concerning the latter, that is, the mind, he reached the conclusion that it is reflexion, not analogy with the physical world, to provide a way to discovery. We could find an anticipation of this distinction between "two" Descartes already in Smith, where, in the Letter to the Edinburgh Review, where he says that the theory of vortices has been completely refuted but the *Meditations* were the only original work produced by the French during two centuries 'in natural philosophy, morals, metaphysics, and the abstract sciences' (Smith 1756: 5). In general, Reid believes that there are two ways to obtain knowledge about the mind: the first is the "way of reflexion" and it is "the only one that leads to truth"; the second is the "way of analogy"; it is "wide and easy" but it leads to error and to the strangest delusions . According to him, the merit of Descartes was having refused recourse to analogy: "The analogical way of reasoning concerning the powers of the mind from the properties of body, which is the source of almost all the errors on this subject [...] was [...] contrary to the principles of Des Cartes" (Reid 1785: 270) . He was "the first who drew a distinct line between the material and intellectual world [...] One obvious consequence of this distinction was, that accurate reflection" (*Ib.*) is the only way to make any progress in the knowledge of our mind. This is why in the philosophy of mind the method adopted led him in a more fruitful direction

than in natural philosophy. In the former, "the method which Des Cartes pursued, naturally led him to attend more to the operation of the mind by accurate reflection, and to trust less to analogical reasoning upon this subject" (Reid 1764: 201). Descartes's great achievement in the study of the human mind, was establishing the way leading to truth as the only one worth for a philosopher. It is on this point that Reid believes to be indebted with Descartes.

By this move, the image of Descartes has changed: he is no longer primarily a physicist, he is now mainly a psychologist. Without trying to refute all the allegations against him moved by his predecessors, Reid drops the controversy between Newtonian and Cartesian physics, assuming that the latter is precisely what is dead in Descartes's contribution but there is an until then unnoticed core in his system: mental powers and knowledge. In this way, Reid transfers Descartes's thought from science to "philosophy".

#### ***L. The distinction between primary and secondary qualities is unjustified***

It is amazing how Reid may have been enthusiastic about some aspects of Descartes's thought and at the same time may have fiercely attacked others. The distinction between primary and secondary qualities proves dangerous to the eyes of Reid because of his anti-sceptical concerns, in that he fears the implications Berkeley and after him Hume drew from it.

He declares, for example, that if Descartes who, together with Locke and Malebranche, had revived this distinction had "had seen all its consequences", as clearly as Hume was able to do, "he would have had strong suspicions as to its validity and would have examined it more carefully" (*Ib.*: 132). This theory was in fact "similar to the horse of Troy", it seemed something very simple, very beautiful and innocent, but "it carried in its belly the death and destruction of all science and common sense" (*Ib.*).

## **7. ADAM FERGUSON**

Adam Ferguson, renowned as the author of the *Essay on the History of Civil Society* published in 1766, was also the author of the *Principles of Moral and Political Science*, a systematic treatise on the subjects of his courses at Edinburgh University. Ferguson was, in both the *Essay* and the *Principles* above all Adam Smith's pupil; nevertheless, in the last work (which is a new version

of the *Institutes of Moral Philosophy*, published in several editions since 1769) he also adopts a few of Reid's ideas.

### **B. *Against conjectures and the theory of vortices***

Concerning Descartes, Ferguson repeats first MacLaurin's main claim, which he had received through Smith, that is, the idea that "supposition" or "hypothesis" is a source of error, and that the theories of vortices provides an infamous example of its effects. Newton "shows that phenomena can be understood thanks to the very well-known laws of motion and gravitation, laws that are familiar to us in the earthly sphere and therefore also applicable to the heavens" (Ferguson 1792, I: 116) . Descartes, on the contrary, with his vortices, heaped up "supposition on supposition, without any evidence of reality" (*Ib.*: 117)<sup>7</sup>.

Ferguson adds an idea which will become typical of Dugald Stewart, namely the idea that the search for causes "which can be supposed to be occult" is a vain undertaking, while the investigation of a "law of nature, whose very name implies a certain number of facts that are known to exist" (*Ib.*) is free from danger.

### **D. *Deceit is the reason for the Cartesian system's success***

The ultimate cause of the Cartesian error lies in human psychology, since "love of science and love of the system are the same thing" (*Ib.*: 278). While science ascribes a new phenomenon "to some already known law or characteristic of being", system or hypothesis "imagines some new principle more suited to this end" (*Ib.*: 279). The method of hypothesis is condemned by Newton's first *regula philosophandi* according to which "we must not assign to some phenomenon a cause which is not known in itself as being a fact of nature" (*Ib.*); it is on the basis of this principle that we "reject the hypothesis or the mere supposition of a cause [...] like Descartes's vortices" (*Ib.*).

### **F. *Universal doubt and Cogito are untenable***

The second point on which Ferguson discusses Descartes is doubt and skepticism. In this regard he takes up the essence of Reid's arguments, that is, the criticism of "foundationalism", while

choosing a much more nuanced position about skepticism (which was Reid's great enemy). Ferguson recalls the role of doubt and of the Cogito in Descartes's thought and adds that "this limited application of the term evidence [...] may be the cause of this skepticism which denies assent" in matters of sensuous perception (*Ib.*: 90). Ferguson's answer (which is a prelude not only to the philosophy of common sense but also to Peirce's pragmatism) is that skepticism arises from a too narrow definition of evidence, since the skeptic's maxim, namely, that we should not admit of any information without the evidence that should be laid before us if it were true" (*Ib.*), may warn us of some possible source of error; but we should also admit of the opposite maxim, that is, that "information corroborated by all evidence that it might have received if it is true, should be considered sufficient to command us belief" (*Ib.*: 91).

## **8. Dugald Stewart**

Dugald Stewart was the most influential figure of Scottish philosophy between the eighteenth and the nineteenth centuries. He developed the philosophy of mind Reid had founded, while preserving the project of a systematic moral science which should include also politics and economics.

His judgment on Descartes recognizes his unique quality "as the father of authentic metaphysics", but also his errors in this science, errors that "were on a proportionate scale of magnitude" (Stewart 1815: 138).

### ***C. Against systems and oversimplification***

Stewart believes that Descartes' errors in metaphysics, such as "his obstinate refusal of all speculation about final causes", or the paradox of "making extension the essence of matter" derived to an important extent from his conclusions in physics, such as the exclusion of vacuum and the theory of vortices" (Stewart 1792, II: 138, note 4). Stewart cursorily mentions that "proneness to simplification" which is encouraged by analogies (*Ib.*: 180) as a cause of the identification of laws with efficient causes (he does not mention Descartes explicitly). Descartes's mistaken ideas on causality were in fact the main cause of shortcomings in his physics (*Ib.*: 479).

## **H. *Hypotheses non fingo = causes unknowable***

Drawing a distinction roughly parallel to the Kantian one between “empirical philosophy” and “pure philosophy” or “metaphysics”, Stewart's efficient causes and essences are opposed to general phenomena and laws: the first are the subject of metaphysical speculation, while the latter are the subject of "experimental philosophy". He acknowledges that natural philosophers have, in modern times, wisely abandoned to metaphysicians, all speculations concerning the nature of that substance of which it is comprised” as well as of “the efficient causes of the changes which take place in it”, and they have been content with “the humbler province of observing the phenomena it exhibits, and of ascertaining their general laws”; thus “This experimental philosophy, no one now is in danger of confounding with the metaphysical speculations already mentioned” (*Ib.*: 13) concerning the ultimate elements "of which phaenomena of nature such as electricity are composed", as well as about "efficient causes of changes taking place"; they have confined themselves to " the humbler province of observing the phenomena it exhibits, and of ascertaining their general laws”; thus, nobody risks to mistake such “experimental philosophy” with " metaphysical speculations". A similar distinction takes place among the questions which may be stated relative to the human mind, that are divided too into metaphysical questions and experimental questions” (*Ib.*)

Newtonian methodology is interpreted by Stewart in the light of this distinction between 'essence' and 'phenomena', declaring that "On the chains, indeed, which nature makes use of to bind together her several operations, Newton has thrown no light whatever; nor was it the aim of his researches to do so. The subjects of his reasonings were not occult connections, but particular phenomena, and general laws (*Ib.*: 338)

## **I. *The distinction between primary and secondary qualities is (partly) unjustified***

Reid is right in believing that Descartes's distinction between primary and secondary qualities owes all its plausibility to the ambiguity of words. But the case seems to be different with respect to *colours*, of the nature of which the vulgar are apt to form a very confused conception, which the philosophy of Descartes, thanks to the distinction it introduces between two different sorts of quality, "has a tendency to correct (Stewart [1792], I: 502). The most important of all his

improvements in metaphysics was, quite simply, the distinction which he has drawn with so much clarity and force between the *primary* and *secondary* qualities of matter (*Ib.*: 125). But above all, Reid is wrong when he accuses Descartes of having made "a sophistical play on words about the non-existence of secondary qualities" when, on the contrary, he was the first to unmask "this Scholastic parallogism" (Stewart 1815: 126).

### ***L. Reflexion against analogy***

Familiarity with the phenomena of the material world may cause a mistaken impression of having done some progress in the philosophy of mind when "we can point out some analogy between them" and the phenomena of the mind; "the analogies we are pleased to fancy between them, can be of no use in illustrating either" (Stewart [1792], II:13); but as the two subjects are essentially distinct "the analogies we are pleased to fancy between them, can be of no use in illustrating either" (13). In this regard, Stewart acknowledges Descartes' merit in understanding the "futility of any theory" which attempts to explain the phenomena of the mind "by metaphors derived from the material world" (Stewart [1815]: 113) as well as in having affirmed the need "to disregard the analogy of matter by studying the laws of our intellectual constitution" (*Ib.*: 115). It is for this reason that we can recognize in him "the father of the experimental philosophy of mind" (*Ib.*: 113).

## **9. Concluding Remarks**

I have described the story of a reception, of the opposition that was created between two images, that of Newton and that of Descartes, of consequences that this opposition caused concerning the image of Descartes, and finally of the changes in this image that were due to changes in the eighteenth-century context of scientific and philosophical problems. Now, I will try to draw some conclusions from the above reconstruction.

(1) the image of Descartes produced by the Scottish Enlighteners was a by-product of what was primarily a scientific controversy; philosophical arguments were brought into the picture more as asides than as a primary focus of interest. After 1800, at a time when there was no Cartesian

physics left as a scientific alternative to Newtonian physics, only the philosophical arguments were left, with no memory of the context out of which they originated. In Reid, and then in Dugald Stewart, the focus shifts progressively from physics to the philosophy of mind and the theory of knowledge.

It was this process, in a sense, that created the 'Cartesian philosophy' how it is known today: Cartesianism at the beginning of the eighteenth-century meant the doctrine of vortices; from the beginning of the nineteenth century, it meant the Cogito.

(2) Also Newton's image as presented by the Scots was by no means a neutral and objective one: the impossibility to know essences and the anti-systematic implications of the Newtonian fourth rule were overstressed by the Scottish rhetorical strategy aimed at producing an image of Newton as the "anti-Descartes. This reading of the opposition of Newton and Descartes was a side-effect of the program of the Scottish Newtonianism, a blend of epistemological realism based on belief and of methodological experimentalism based on hatred of apriorism and deductivism.

(3) Both the image of Descartes and the philosophical arguments against his work were left as a bequest to German idealism via Hume and Reid. Some interesting features of the MacLaurin-Hume-Smith interpretation of Newtonianism (the experimental character of Newtonianism, the interweaving of facts and delusion, the dangers of systems and of mono-causality) were left aside in the German idealist reading of Descartes, while they were preserved in British Victorian methodological thinking, partly in Comte's positivism, and were, in a devious way, transferred to Peirce's pragmatism<sup>8</sup>. The legacy left to Peirce was: the critique to foundationalism, i.e., the refusal of any absolute starting-point, of introspection, and of mono-causality.

## Acknowledgments

I am grateful to Marco Geuna for useful suggestions concerning Adam Ferguson.

## Notes

1. On the Scottish Enlightenment see Campbell and Skinner 1982 (and in particular Skinner's Introduction), and Chitnis, 1976; on moral Newtonianism moral see Forbes 1975: 3-18; Cremaschi 1989.
2. See Schofeld 1978; Gilardi 1990: 259-272; Cremaschi 1982.
3. Cf. Passomore 1952: 12.
4. See Cremaschi 1989.
5. See Cremaschi 1981; 1984: 34-72.
6. See Robinson 1986.
7. See what Ferguson had said on the same subject in the Introduction to his *Institutes* (Sect. IV, "Of theory"): "To pretend to explain phenomena by showing that they may be comprehended in a supposition or hypothesis [...] is

illusory in science. This the vortex of Descartes, being a mere supposition, could not explain the planetary motions (Ferguson 1773: 8).

8. See Olson 1975.

## Bibliography

### Sources

Descartes, R. [1647] 1964-1974. *Principes de la philosophie (Œuvres. 11 vols. Ed. Ch. Adam et P. Tannery. X.2)* Paris: Vrin.

Ferguson, A. [1773] 1978. *Institutes of Moral Philosophy* (2nd edition). New York: Garland.

---. [1792] 1978. *Principles of Moral and Political Science*. 2 vols. New York: Garland.

Hume, David, *The History of England*, New York: Lovell, no year, 6 vols.

Hume, David. 1739-40. *A Treatise of Human Nature*, in *The Philosophical Works*, ed. Thomas H. Green; Thomas H. Grose, vols. 1 and 2. Aalen: Scientia Verlag, 1964.

— . 1748a. *Of the rise and progress of the Arts and Sciences. Ib.*, vol. 3.

---. 1748b. *Inquiry concerning Human Understanding*. En *The Philosophical Works. Ib.*, IV: 3-135.

---. 1754-1762. *The History of England*. 6 vols. New York: Lovell s.d..

MacLaurin, Colin. [1748] 1971. *An Account of Sir Isaac Newton's Philosophical Discoveries*. Hildesheim: Olms.

Reid, Thomas. [1764] 1967. *Inquiry into the Human Mind*. In *Philosophical Works*. Hildesheim: Olms. Vol. I.

— . EIPM. [1785] 1967. *Essay on the Intellectual Powers of Man*. In *Philosophical Works*. Hildesheim: Olms. Vol. I.

Smith, Adam. [1759] 1976. *The Theory of Moral Sentiments*, ed. David D.Raphael; Alan L. Macfie. Oxford: Clarendon Press.

— . *The Principles which lead and direct Philosophical Enquires: illustrated by the history of Astronomy*, in *Essays on Philosophical Subjects*, ed. William P.D.Wightman; John C.Bryce; and I.S.Ross, Oxford: Clarendon Press, 1980.

— . *Letter to the 'Edinburgh Review'*. *Ibidem*

— . *Lectures on Rhetoric and Belles Lettres*. ed. J.C. Bryce, Oxford: Clarendon Press, 1982.

Stewart, D. [1792] 1854. *Elements of the Philosophy of the Human Mind I*. Edinburgh: Constable.

— . [1813], 1854. *Elements of the Philosophy of the Human Mind II*. Edinburgh: Constable.

— . [1826] 1854. *Elements of the Philosophy of the Human Mind III*. Edinburgh: Constable.

— . [1815] 1854. *Dissertation: Exhibiting the Progress of Metaphysical, Ethical, and Political Philosophy*. In *The Collected Works*, I: 112-141. Edinburgh: Constable.

### Commentaries

Campbell, R.A. et Skinner, A.S. (eds.). 1982. *The Origins and Nature of the Scottish Enlightenment*. Edinburgh: Donald.

Camic, Ch. 1983. *Experience and Enlightenment*. Edinburgh: Edinburgh University Press.

Cremaschi, S. 1981. "Adam Smith, Newtonianism and Political Economy" *Manuscripto* 5 (1): 117-134.

— . 1984. *Il sistema della ricchezza. Economia politica e problema del metodo in Adam Smith*. Milan: Angeli.

— . 1989. "Adam Smith. Sceptical Newtonianism, Disenchanted Republicanism, and the Birth of Social Science". In M. Dascal and O. Gruengard (eds.). *Knowledge and Politics*. Boulder, Co: Westview Press, 83-110.

— . 1992. "L'illuminismo scozzese e il newtonianismo morale". En M. Geuna et M.L. Pesante (eds.). *Interessi, passioni, convenzioni. Discussioni settecentesche su virtù e civiltà*. Milan: Angeli, 41-76.

Forbes, D. 1975. *Hume's Philosophical Politics*. Cambridge: Cambridge University Press.

Gilardi, R. 1990. *Il giovane Hume*. Milan: Vita e Pensiero.

Noxon, James. 1973. *Hume's Philosophical Development*, Cambridge: Cambridge University Press.

Olson, R. 1975. *Scottish Philosophy and British Physics 1750-1880*. Princeton: Princeton University Press.

Passmore, J.A. 1952. *Hume's Intentions*. Cambridge: Cambridge University Press.

Robinson, D.N. 1986. "The Scottish Enlightenment and its Mixed Bequest" *Journal of the History of the Behavioral Sciences* 22(2): 171-177.

Sheperd, C.M. 1982. "Newtonianism in Scottish Universities in the Seventeenth Century". In Campbell and Skinner (eds.) 1982, 65-85.

Schofield, R.E. 1978. "An Evolutionary Taxonomy of Eighteenth-Century Newtonianisms", *Studies in the Eighteenth Century Culture* 7: 175-192.