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## THE ELIZABETH EISENSTEIN ESSAY PRIZE 2017

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The Elizabeth Eisenstein Prize is open to all NCIS members and recognizes excellence in independent scholarship. The Prize is awarded annually for the best peer-reviewed published article submitted by a member of NCIS, and brings the winner an honorarium, which this year is \$350. The Eisenstein Prize was established in April 1993 and is named for Elizabeth Lewisohn Eisenstein (1923-2016), Professor of History at American University (1959–1979) and the University of Michigan (1975–1985), and mother of Margaret DeLacy, one of NCIS’s founders, in recognition of Professor Eisenstein's long-standing support of NCIS. After 2012 the Prize lapsed due to lack of funding, but was revived this year following Professor Eisenstein's passing in January 2016, with funding from NCIS and Margaret DeLacy.

Elizabeth Eisenstein Prize is awarded annually in memory of Professor Elizabeth Eisenstein for the best academic journal article or book chapter published by a member of NCIS. The article must have been published in a peer reviewed journal or edited academic book within the last two years, and all authors must be members of NCIS, whether the authorship is single or multiple. Details at <https://www.ncis.org/grants>

In 2017 the Eisenstein Prize again drew a strong field, and Committee Chair Dr Joan Cunningham reported that there were some exceptional papers, of which two were neck and neck in the scoring. Rather than name one as winner and the other as runner-up, the Executive Committee, in consultation with Professor Eisenstein's daughter Margaret DeLacy, agreed to split the prize money—and kudos—between two winners:

- 1) **Patricia Silver** for “Remembering Abuela: Memory, Authenticity and Place in Puerto Rican Orlando,” *Latino Studies* 13.3: 376–401;
- 2) **Toni Vogel Carey** for “Adam Smith's Invisible Hand: A Brief History,” *Adam Smith Review* 9 (2017): 88-104.

Although the publishers of *Latino Studies* have not responded to our requests to reprint Dr Silver's article, we are delighted to be able to reprint Dr Carey's winning essay here.

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## ADAM SMITH'S INVISIBLE HAND: A BRIEF HISTORY

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Few terms in the lexicon are less explanatory than Adam Smith's 'invisible hand'. So we should not really be surprised that it appears only three times in the Smith corpus, and in places so hidden they too are almost invisible: in 'The Principles which Lead and Direct Philosophical Enquiries; Illustrated by the History of Astronomy' (AST) (III.2; 1980: 49); in *The Theory of Moral Sentiments* (TMS) (IV.i.10; 1976a: 184); and in *Wealth of Nations* (WN) (IV.ii; 1976b: 456).<sup>1</sup> Why, then, is it *this* for which he is best known?

Oddly, that question is seldom asked, although the answer lies close to hand. For while the *term* doesn't amount to much, the *idea* – that much in human life is the product of human action but not of human design – 'permeates all his social and moral theories', as Karen Vaughn notes in the *New Palgrave* (1987: 998). I count at least nine appearances of the idea in WN (II.iii: 343; II.v.37: 374; III.iv.17: 422; IV.ii.4: 454; IV.ii.9: 456; IV.v.b.3: 525; IV.vii.c.88: 630; IV.ix.28: 674; V.i.g.25: 803-4) and two in TMS (II.i.v.10: 77-8; IV.i.10: 83-5). It lies at the foundation of 'Considerations Concerning the First Formation of Languages' in Smith's *Lectures on Rhetoric and Belles Lettres* (LRBL) (1983: 201-26), his four-stage theory of socio-economic development (hunting-shepherding-agriculture-commerce) presented in the *Lectures on Jurisprudence* (LJA i.27-35; 1978: 14-16), and the four-stage development of science in the 'Astronomy' essay.<sup>2</sup>

We now have good historical research on the term (Rothschild 2001: 118-21; Samuels 2011: 219), but far less toward a history of the idea, which is the subject of this paper. What I can offer here, though, is only a brief overview of this very large topic. I will say something about its roots in the concept of *laissez faire*, both ancient and in early modern medicine and the law; its transitional place within Scottish 'sociological evolutionism' (Forbes 1954: 645-6) between seventeenth-century physics and nineteenth-century biology; its kinship with the nineteenth-century concept of 'consilience'; and its recent rebirth in the contemporary science of 'selforganization'. My purpose is to bring out important developments in the history of the invisible hand concept, both before and particularly since Smith's time, which have received little notice to date in the scholarly Smith literature.

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<sup>1</sup> As Emma Rothschild points out (2001: 118), Dugald Stewart and others gave its treatment by Smith little notice – although as she also notes (122), Stewart did use the term in his own work.

<sup>2</sup> That is, from a primitive pre-scientific appeal to 'the invisible hand of Jupiter' (III.2: 49) to Aristotelian essentialist explanation of each species separately (LRBL ii.133: 145), to Descartes, the first to posit an 'invisible chain' of conceptual connections (IV.61: 92), to Newtonian gravity, the 'most admirable improvement that was ever made in philosophy' (IV.67: 98).



## 1. TWO INVISIBLE HANDS

First, though, some clarification of the concept, because commentators have claimed to see as many as four (Ahmad 1990) – ten (Grampp 2000) – even forty-eight invisible hands in Smith's writings.<sup>3</sup> I think two will suffice, the one that gets the lion's share of attention, and the one that quietly does more of the real work.<sup>4</sup>

Most of the attention, of course, has gone to the idea presented in the invisible-hand statement in WN (IV.ii.9: 456), that individuals, in pursuing solely their own private gain, are led by an invisible hand to promote the interest of society, sometimes more effectively than when they really *try* to promote it. This idea poses the kind of paradox dear to Smith's heart, for it goes against the well-entrenched assumption that commerce is a zero-sum (win-lose) game, and presents the free market as basically a win-win phenomenon (Vivenza 2001: 63; Fleischacker 2004: 91). People usually associate unintended consequences with surprises to the downside, and Smith certainly recognizes that there can be invisible 'backhands' as well as 'forehands'.<sup>5</sup> He does not mince words, for example, that the monotony caused by the division of labor can render factory workers 'as stupid and ignorant as it is possible for a human creature to become' (WN V.i.f.50: 782). Still, Smith's theory turns on the premise that invisible-hand surprises are predominantly to the upside.

That is one invisible hand principle, which I will call IH-1. The *other*, IH-2, concerns what is known as 'spontaneous order'.<sup>6</sup> IH-2 is also paradoxical, for it goes against the well-entrenched assumption that social order must be the product of deliberate design. IH-2 does not appear in *any* of the three invisible hand statements.<sup>7</sup> Yet it is 'perhaps the single most significant sociological contribution' of the Scottish Enlightenment (Hamowy 1987: 3). Consider David Hume's remark, for example, in the *Dialogues of Natural Religion* ([1779] VII; 1935: 221).<sup>8</sup>

A tree bestows order and organization on that tree which springs from it, without knowing the order: an animal, in the same manner, on its offspring: a bird, on its nest. And instances of this kind are even more frequent in the world, than those of order which arise from reason and contrivance.

In the *Treatise of Human Nature* Hume combines both invisible hands in a single sentence ([1739] III.ii.6; 1978: 529), asserting that 'self-love' is 'the real origin' of moral rules [IH-2], a system that is 'advantageous to the public, tho' it be not intended for that purpose by the inventors' [IH-1].<sup>9</sup>

The *locus classicus* of the idea of spontaneous order, though, is arguably Adam Ferguson's *Essay on the History of Civil Society*. 'Nations stumble upon establishments', he wrote in 1767 (1819: 222), as 'the result of human action, but not the execution of any human design'.

The artifices of the beaver, the ant, and the bee are ascribed to the wisdom of nature. Those of polished nations are ascribed to themselves, and are supposed to indicate a capacity superior to that of rude

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<sup>3</sup> Warren Samuels, according to Montes (2004: 152, n.42). Grampp may not subscribe to all ten.

<sup>4</sup> On two invisible hands, see Forget 2001: 193. Rosenberg's 1988 title is a bit misleading, since one of the two hands is Darwin's. Ullmann-Margalit's treatment (1978) is also misleading, because while she delineates two invisible hands, both Smith's, she then effectively discredits one of them; on this, see Carey 1998: 432-4.

<sup>5</sup> I take these terms from Pettit 1993: 270 & *passim*. The invisible hand sometimes produces mixed results, advantaging those who could be expected to lose and disadvantaging (or doing nothing for) those we would expect to win. In WN (V.i.g.25: 803-4) 'the inferior ranks of people' are advantaged at the expense of their overlords. In TMS (IV.i.10: 184-5) the invisible hand does nothing for the landlord who orders his table set with far more food than he can eat (after all, his stomach is no bigger than anyone else's), but it enables his servants to dine almost as well as he does from the leavings of his table. Also see Nozick 1994: 314.

<sup>6</sup> On the history of 'spontaneous order', see Hamowy 1987 (Intro. 6-10); Smith 2006: 4-7.

<sup>7</sup> It does precede the invisible hand statement in TMS (IV.i.10: 183), where nature's 'deception' is said to have led people, from a misguided desire for 'wealth and greatness', to 'cultivate the ground... found cities...to invent and improve all the sciences and arts...[things] which have 'entirely changed the whole face of the globe'.

<sup>8</sup> This work was begun and largely completed in the 1750s (Ross 1995: 338).

<sup>9</sup> Hume does say these rules are not of 'a natural origin, but...of artifice and contrivance'. But by 'contrivance' here I take him to mean merely that individuals act for what they perceive is their own advantage, not that anything like central planning is involved.



minds. But the establishments of men, like those of every animal, are suggested by nature, and are the result of instinct. [They] arose from successive improvements...made without any sense of their general effect. (ibid. 327-8)

These 'establishments' include the very foundations of human society: language and law, money and morality. 'No single genius, however vast', Ferguson says in the *Principles of Moral and Political Science* ([1792] I.i.4; 1973: 42), 'is equal to the invention of a language such as even the vulgar speak'. Ferguson's social science rests on IH-2, and it is doubtless for this that Gibbon and others have identified him as the father of the field (Trevor-Roper 1967: 1657; Lehmann 1930: 238-40).

Craig Smith (2006: 7) identifies the invisible hand of societal betterment (IH-1) with the American libertarian tradition, and the hand of spontaneous order (IH-2) with British classical liberalism. I do not disagree at all with this distinction, but I want to suggest a comparison that is particularly useful for our purposes: that between mixtures and compounds in chemistry. IH-1 is like a mixture; it is additive, involving merely changes in *degree*. IH-2 is like a compound; it is transformative, involving differences in *kind* that are difficult, if not impossible to reverse.

Emma Rothschild has dismissed Smith's invisible hand as little more than 'a mildly ironic joke' (2001: 116, 153 and passim). Her acknowledgment that her evidence for this reading is only indirect (ibid. 117) goes largely unnoticed, as does her suggestion that the *term* describes an *idea* 'of profound importance to his theoretical system' (121). Twice on one page (135) she calls 'the metaphor of the invisible hand... serious, and unironic in its intimation that there can be order without design'. I don't consider one meaning silly and the other serious; but I do consider one *more* serious than the other; and we agree which one this is.

## 2. LAISSEZ FAIRE LA NATURE

*Laissez faire* encompasses both IH-1 and IH-2. It goes back to the ancient premise of Taoism, that the Tao does nothing, yet it is the Way by which all things are done.<sup>10</sup> Calling on a distinction going back to Aristotle's *Physics* (254b12-255a7) that Smith mentions in AST (IV.38: 78), Dugald Stewart glosses Hume's position that 'the policy of ancient times was VIOLENT, and contrary to the NATURAL course of things' ('Life of Smith' [1795] IV.11; 1980: 314):

I presume he means that it aimed too much at modifying, by the force of positive institutions, the order of society...without trusting sufficiently to those principles of the human constitution, which, wherever they are allowed free scope, not only conduct mankind to happiness, but lay the foundation of a progressive improvement in their condition and in their character. The advantages which modern policy possesses over the ancient arose principally from its conformity, in some of the most important articles of political economy, to an order of things recommended by nature.

Stewart also quotes from a Smith manuscript of 1755 (ibid. IV.26: 322) that directly addresses the superiority of nature to the designs of 'projectors' in bringing the wealth of nations.

[Rather than] disturb nature in the course of her operations in human affairs...it requires no more than to let her alone, and give her fair play in the pursuit of her ends, that she may establish her own designs... Little else is requisite to carry a state to the highest degree of opulence from the lowest barbarism, but peace, easy taxes, and a tolerable administration of justice; all the rest being brought about by the natural course of things.

In later antiquity the *laissez faire* basis of the invisible hand goes back to Stoic ideas prominent in TMS: that everyone is 'first and principally recommended to his own care' (VI.ii.1.1: 219),<sup>11</sup> the 'eternal art which educes good from ill' (I.ii.3.4: 36), and the like.

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<sup>10</sup> I have seen this idea traced to the sixth century B.C.; Hamowy (1987: 6) traces it to the fourth.

<sup>11</sup> Smith has no use for Stoic doctrine where it goes against this idea and requires individuals to subordinate their own interests and concerns to the good of the universe as a whole; that is 'altogether different', Smith says, from what 'Nature has sketched out for our conduct' (TMS VII.ii.1.43: 292).



Political economics has roots in both law and medicine (the two professional degrees other than theology awarded in medieval European universities). In early modern history its dominant philosophy was mercantilism, based on economic regulation in order to protect a state's markets and power. The 'cameralist' school in Germany (from the medieval Latin *camera*, meaning 'treasury') similarly promoted central planning and regulation of socio-economic affairs. *Laissez faire* economics developed largely in reaction to mercantilism, and by the mid-eighteenth century it largely prevailed. The phrase '*laissez-faire, laissez-passer*' is associated with the Physiocrat Quesnay, whose position, according to the Original Index for WN (1976b: 1064), Smith 'generally subscribed to', but whom he also criticized (see below).

Similar to the split in political economics is that between statute law, which is a product of conscious human design, and *natural* law, which harks back to the Stoic trust in nature (Wollheim 1967: 451). Smith says explicitly in the last sentence of LJ that he has covered 'both the laws of nature and the laws of nations'. Common law is a cross between the two. Like statute law, it is man-made; like natural law, it lacks any deliberate plan or end-in-view. Thus it is a product of human action but not of human design. And its proponents hold that its invisible-hand character makes common law more stable than statute law, being less easily subverted by special interest groups and the shenanigans of individual legislators (Barry 1988: 52).

Medicine shows a parallel bifurcation between a *laissez faire* and a cameralist school, the latter, again, centered in Germany. Cameralists followed Paracelsus (1493-1541) in holding that physicians should 'improve on Nature by proactively intervening in the life of a patient', overseeing things such as diet, sanitation and working conditions (Olson 2003: 452). By contrast, men like John Locke (who served as Lord Shaftesbury's physician and also wrote treatises on economics) followed Galen and Hippocrates in considering illness a pathological interference with otherwise self-regulating natural processes. According to this *laissez faire* school of medicine, the job of a physician is simply to remove the impediment, and then let nature take its course. Think of Smith's 'unknown principle of animal life', which 'frequently restores health and vigour to the constitution, in spite, not only of the disease, but of the absurd prescriptions of the doctor' (WN II.iii.31: 343).

In his *Elements of Commerce* of 1755 Josiah Tucker connected the dots between the physical and the political body:

The physician to the body politic may learn to imitate the conduct of the physician to the body natural, in removing those disorders which a bad habit, or a wrong treatment hath brought upon the constitution; and then to leave the rest to nature, who best can do her own work. For after the constitution is restored to the use and exercise of its proper faculties and natural powers, it would be wrong to multiply laws relating to commerce as it would be to be forever prescribing physic. (Quoted in Olson 2003: 452-3)

Smith too connects these dots, in the process chiding Quesnay ('who was himself a physician') for thinking the political body 'would thrive only under...the exact regimen of perfect liberty and perfect justice'. If a nation could not prosper except under these ideal conditions,

there is not in the world a nation which could ever have prospered. In the political body, however, the wisdom of nature has fortunately made ample provision for remedying many of the bad effects of the folly and injustice of man; in the same manner as it has done in the natural body for remedying those of his sloth and intemperance. (WN IV.ix.28: 674)

### 3. SOCIOLOGICAL EVOLUTIONISM

Well before 1700, Samuel Pufendorf was grounding moral tenets not in biblical texts, but in 'the nature of things and the circumstances of human life' (Moore and Silverthorne 1983: 76). The final Query 31 of Newton's *Opticks* contains the pregnant suggestion, 'If Natural Philosophy, in all its Parts, by pursuing this Method, shall at length be perfected, the Bounds of Moral Philosophy will also be enlarged'.<sup>12</sup> The title page of George Turnbull's *Principles of Moral Philosophy* of 1740 quotes both Newton's Query 31 and Alexander Pope's *mot* in the *Essay on Man*: 'account for moral,

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<sup>12</sup> The first edition of the *Opticks* appeared in 1704, but the final Query 31 did not appear until the second edition of 1718.



as for nat'ral things'. David Fordyce asks in his *Elements of Moral Philosophy* of 1748 (2003: 24), 'To what Conduct are we obliged?' and answers: 'Attend to Nature, and Nature will tell with a Voice irresistibly audible and commanding'.

But what did the Scottish philosophers mean by 'Nature'? One thing they did not mean is mere mechanical matter-in-motion. We hear a lot about Smith's allusions to mechanics – society as 'an immense machine' (TMS VII.iii.1.2: 316), a philosophical system as 'an imaginary machine invented to connect together in the fancy those different movements and effects which are already in reality performed' (AST IV.19: 66), and so on. We hear a good deal less about his biological images, although they are at least as significant. It can hardly be just a coincidence, for example, that at least four times in TMS (II.i.5.10: 77; II.ii.3.5: 87; III.iii.13: 142; IV.i.10: 185) – including the only appearance of the term 'invisible hand' in this work – Smith refers to the 'propagation' or 'multiplication of the species'. In contrast to the Cartesian split between humans as *res cogitans* and everything else, including animals, as merely *res extensa*, The Scottish thinkers considered humans more like than unlike (other) animals. 'Every animal', Smith declares, citing 'the founder of the Stoical doctrine', was 'endowed with the principle of selflove' (TMS VII.ii.1.15: 272).

Boerhaave's mechanistic physiology in Leiden had dominated medicine for more than a century. But at the Edinburgh medical school (the first in Britain, founded in 1726), Robert Whytt and others 'reintroduced the soul into the body' with the idea of *sympathy*, a mutuality of feeling among different bodily parts transmitted through the nervous system. That put 'sensibility and its special case "sympathy"' at the basis of morality and physiology alike, which puts a 'new' cast on sympathy as the central sentiment in TMS that commentaries need to take into account. (Lawrence 1979: 20-8; Carey 2011: 227-8)

In light of these developments it is not enough merely to note Smith's outsized admiration for Newton's principle of gravity as 'the greatest discovery that ever was made by man' (AST IV.76: 105). Nor is it enough to note Dugald Stewart's comment (1829, 2: 240) that the Scottish philosophers did not preclude a 'still happier system in time to come' in natural philosophy, or Ferguson's (1973, 1:194) that 'as Newton did not acquiesce in what was observed by Kepler and Galileo, no more have successive astronomers restricted their view to what Newton has demonstrated'. These remarks show the Scots' admirable openness to new ideas, and their enlightened view of science as an inherently open-ended process (Montes 2006; Schliesser 2005b). But in light of scientific developments well underway in Scotland by mid-century, we need to understand 'the science of the connecting principles of nature' (AST II.11: 45) as embracing an increasingly broad range of connections. In the *Lectures on Jurisprudence* (LJB 114: 443), for example, Smith declares that 'the laws of nature are the same everywhere, the laws of gravity and attraction the same, and why not the laws of generation[?]' Even as the Scots extolled scientific achievements of the seventeenth century, they were making advances toward developments to come in the nineteenth.

This Janus-like position is particularly striking because seventeenth-century mechanics and nineteenth-century biology do not go together like love and marriage. I mentioned the difference between mixtures and compounds in chemistry. In classical economics, society is like a mixture, merely the sum of its individuals. But organisms, as Stephen Jay Gould points out (2003b: 227), must be explained 'as organisms, and not as a summation of genes', even if all we have to work with are the genes and their interactions. There is a difference in *type*, that is, between the antecedent or cause (the dispersed activity of individuals/genes) and the consequent or effect (the origin of language/species). And if you're looking for a path from the one to the other, some say 'you can't get there from here' (Hands 1997: S112-13).<sup>13</sup>

#### 4. SMITH AND DARWIN

Yet Scottish physiologists were well on their way 'there', having crossed over from a mechanistic to an organic view of animal life, and unified humans and other living creatures through sub-rational functions like sentiment and instinct, which they considered more foundational even in human affairs than full-blown reason (Bryson 1945: 56; Carey 2011).

In this light it is noteworthy that the historian of biology Sylvan Schweber points to 'the Scottish view of trying to understand the whole in terms of the individual parts and their interactions'. And he goes on to suggest that Darwin's

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<sup>13</sup> Also see Olson 2003: 439.





reading of Smith and Dugald Stewart in the summer of 1838 – just before he read Thomas Malthus and hit upon the idea of natural selection – led him to dispense with the idea that the struggle for survival occurs between *species*, as he had formerly assumed, and accept that it occurs between *individuals* within the same species (1977: 277-80).

We know from his journals that Darwin at least ‘skimmed’ parts of TMS, and noted that it ‘ought to be studied for comparison of man & animals’ (Vorzimmer 1977: 129). In the *Descent of Man* he mentions Smith by name, referring specifically to the notion of sympathy in ‘the first and striking chapter’ of TMS (1981: 81& n.17). Later in this work (164) he expressly says that sympathy ‘was originally acquired, like all the other social instincts, through natural selection’.

IH-2 gives rise to new social institutions; natural selection, to new species. Both posit the emergence of complex structures that we would normally attribute to conscious design, human or divine. Both explain these developments as unplanned and unintended products of dispersed individual activity. And both suppose that the tendency over time will be ‘the multiplication of the species’, to quote – not Darwin, but Smith.

TMS was published in 1759, the *Origin of Species* in 1859. I don’t mean to imply, though, that Scottish sociological evolutionists were the only ‘Darwinians before Darwin’ (Hayek 1973: 23 and n.33), nor either that they believed they were. Smith’s library contained sophisticated biological evolutionary theories advanced in France by Diderot (1754), Buffon (1750) and Maupertuis (1756).<sup>14</sup> There was also an idea mentioned in passing by Rousseau, that *homo sapiens* and the ‘orang-outang’ belong to the same species. Lord Monboddo made much of this, leading one nineteenth-century Scot to wax poetic (Lovejoy 1948: 41,45,61):

Though Darwin now proclaims the law...  
The man that first the secret saw  
Was honest old Monboddo.

The ‘origin of new species’ goes to the idea of spontaneous order (IH-2). But what about the idea of overall progress or improvement (IH-1)? Biologists typically refuse to countenance anything beyond ‘local progress’, that is, superior adaptation of an organism to its immediate ecological environment. The philosopher and historian of biology Michael Ruse once described Darwin’s view of evolution as ‘a directionless process, going nowhere rather slowly’. However, even the most die-hard opponents of ‘global progress’ have a hard time denying that ‘by almost any standard man represents a higher level than primeval mud’ (Dobzhansky 1974: 310). And Ruse has changed his mind, for a reason worth quoting: ‘People who deny that Darwin was a progressionist – and I was one of them – are just plain wrong’, he says. ‘After all, he was the heir of the eighteenth-century British Enlightenment – David Hume, Adam Smith, and...Erasmus Darwin and his circle’ (1988: 97, 104; 1996: 169).<sup>15</sup> Darwin himself was very reluctant to talk about one organism being ‘higher’ than another in the scale of being, and ‘global’ progress was hardly an important theme in the *Origin of Species* (Bowler 1975: 101). But it is there; and note the language of economics in which it is couched:

[Through] Natural Selection...each creature tends to become more and more improved in relation to its conditions. This [local] improvement inevitably leads to the gradual advancement of the organisation of the greater number of living beings throughout the world. But here we enter on a very intricate subject, for naturalists have not defined to each other’s satisfaction what is meant by an advance in organization...Von Baer’s standard seems the most widely applicable and the best, namely, the amount of differentiation of the parts of the same organic being...and their specialisation for different functions; or, as Milne Edwards would express it, the completeness of the division of physiological labour.<sup>16</sup> (Darwin 1991: 92-3)

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<sup>14</sup> Bonar 1932: 37, 56; Mizuta 1967: 39; and see Zirkle 1941: 89-91, 93; Bryson 1945: 53.

<sup>15</sup> None of this, I should make clear, has to do with Social Darwinism, the position that biological ‘survival of the fittest’ explains and justifies dog-eat-dog economic competition. This idea comes neither from Smith nor from Darwin, but from Herbert Spencer, and even he did not coin the term. Its notoriety is quite recent, dating mostly from Richard Hofstadter’s book *Social Darwinism in American Thought* (1944).

<sup>16</sup> As Schweber explains (1980: 256), Milne-Edwards was a highly respected name in biology, and therefore better situated than Smith to ‘license’ Darwin’s use of the ‘metaphor of the industrial economy and its driving force – competition and division of labor – in a biological context’.





Finally, Darwin was of one mind with the Scottish thinkers about the *laissez faire* idea that nature's handiwork is far superior to that of conscious human design (1991: 62):

How fleeting are the wishes and efforts of man! how short his time! and consequently how poor will be his results, compared with those accumulated by Nature during whole geological periods! Can we wonder, then, that Nature's productions should...bear the stamp of far higher workmanship?

## 5. CONSILIENCE

Smith extolled Newton's principle of gravity for at least two reasons: that the parts of his system were 'more strictly connected together than those of any other philosophical hypothesis', but also that these connections emerged out of what had formerly seemed just 'disjointed appearances' (AST IV.76: 104). That order emerges out of apparent chaos in this way is surprising, which means that for Smith surprise triggers not only the *beginning* of the scientific process, but sometimes also the end (AST 4.33: 75).<sup>17</sup>

In 1830 the astronomer John Herschel legitimized surprise as a mainstream scientific criterion of confirmation in his *Preliminary Discourse on the Study of Natural Philosophy*.

The surest and best characteristic of a well-founded and extensive induction... is when verifications of it spring up, as it were, spontaneously, into notice, from quarters where they might be least expected, or even among instances of that very kind which were at first considered hostile to them. Evidence of this kind is irresistible, and compels assent with a weight which scarcely any other possesses.<sup>18</sup> (Herschel 1830: sec.180)

Herschel developed this idea concurrently, if not collaboratively, with a lifelong friend from their Cambridge undergraduate days William Whewell, who sketched it out in an unpublished manuscript in the late 1820s, even listing it among his 'Rules of Philosophizing' (Laudan 1971: 381). In 1840 Whewell coined the term 'consilience of inductions', from the Latin *salire* (to jump), and *con* (together). His favorite example of consilience was universal gravitation, for Newton had found that different kinds of phenomena all 'leapt to' the inverse-square law of attraction (Snyder 2011: 333).

By 1843 J.S. Mill was using the term in his *System of Logic*. This work is also of interest to us for its early use of the term 'spontaneous order'. Scottish Enlightenment scholars seldom trace this term back further than Michael Polanyi in 1941 or 1951; and these may be the first uses of it in the sense we have in mind (Smith 2006: 10). But consilience is a close conceptual relative of spontaneous order, so it is worth noting that both terms go back to the 1840s.<sup>19</sup>

Whewell believed consilience would lead to 'a constant Convergence...towards Simplicity and Unity' (1967 [1840]: 74). Neither he nor Smith put much stock in the mere accumulation of data; and these two stand out in the history of philosophy of science for putting connectivity and simplicity above even conformity to fact.<sup>20</sup> What interested them was

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<sup>17</sup> According to Schliesser (2005a: 710), 'Smith is claiming that it is a mark of a successful theory that it is unexpected, even surprising'.

<sup>18</sup> Note the term 'spontaneous' here. And note Herschel's ultimate appeal to an inner psychological criterion, much like Smith's belief that discovering 'the invisible chains which bind together all these disjointed objects' brings 'repose and tranquility to the imagination', which for Smith is 'the ultimate end of philosophy' (AST IV.13: 61). According to Richard Olson (1975: 253), 'Herschel's ideas were so similar to those of the Scottish school that there is little doubt of a direct relation'. Unfortunately Olson gives scant direct evidence for this claim.

<sup>19</sup> 'It would evidently be a great assistance if...one element in the complex existence of social man is preeminent over all others... For we could then take the progress of that one element as the central chain...each successive link of which...would by this alone be presented in a kind of spontaneous order, far more nearly approaching to the real order of their filiation than could be obtained by any other merely empirical process' (Mill 1974, 2: 925). This passage wins no prizes for lucidity, but it is interesting in calling to mind the conceptual chains emphasized in Smith's 'Astronomy' essay. Mill used the term again in 1873 in *Three Essays on Religion* (Forget 2001, 194).

<sup>20</sup> Dugald Stewart too declared that 'the probability of a hypothesis increases in proportion to the number of phenomena for which it accounts, and to the simplicity of the theory by which it explains them; and...this probability may amount to a moral certainty'



what Whewell called a 'colligation', an act of imagination uniting disparate-seeming facts in 'a new point of view' (Whewell 1967, 2: 469). Thus both men emphasized the elements of imagination and surprise.<sup>21</sup>

We begin to wonder, given the distinctive similarities in their thinking, if Smith may have influenced Whewell. And it turns out that the question is not so much *whether*, as *how much*, for in 1822 Whewell wrote to a friend: 'I still meditate doing something about the History of the Metaphysics of Mechanics though as yet it is only intention. Something like Smith's History of Astronomy but with more historical facts'.<sup>22</sup>

The idea of consilience, as a criterion both of discovery and confirmation, has continued to be embraced by important philosophers of science, although it has never quite risen to predominance. Polanyi describes scientific discovery as 'a process of spontaneous mental reorganization uncontrolled by conscious effort' (1946: 34). Karl Popper singles out as '*the main task of the theoretical social sciences... to trace the unintended social repercussions of intentional human actions*' (1962: 342; italics original). Popper 'required a "good" hypothesis to do precisely what Whewell expected it to do' (Laudan 1981: 196), which, of course, is also what Smith wanted it to do. And Gould sounds for all the world like Smith in describing consilience as a 'highly salutary simplicity of explanation [for] a previously chaotic system of unconnected facts' (2003a: 257).

Of those who have made central use of the criterion of consilience, few have done so because of its association with Herschel and Whewell; but Darwin is one who did. Reading the *Preliminary Discourse* as a Cambridge undergraduate gave him 'a burning zeal to add even the most humble contribution to...Natural Science' (Darwin 1958: 67-8), and there was no one whose good opinion he craved more for his theory of descent than Herschel's. Unfortunately he did not succeed in getting it, or Whewell's either<sup>23</sup> – despite the fact that he rested his case for natural selection heavily on consilience.<sup>24</sup> He wrote to Asa Gray in 1859, as the *Origin of Species* was just coming out: 'I cannot possibly believe that a false theory would explain so many classes of facts; [and] on these grounds I drop my anchor, and believe that the difficulties will slowly disappear' (Darwin 1994, 7: 369). He wrote something similar in a letter to Herschel in 1861 (ibid. 9: 135-6), and in 1860 he incorporated the point in the *Origin* itself (1991: 401).

Gould asserts that 'Darwin constructed the *Origin of Species* as a brief for evolution by consilience', indeed 'the most instructive case for consilience in all of science' (2003a: 211). So it is understandable that scholars in a number of different domains have recognized a close conceptual connection between natural selection and the invisible hand,<sup>25</sup> although once again probably none go as far as Gould, who calls the two concepts 'isomorphic – that is, structurally similar point for point, even though the subject matter differs' (1990: 14).

## 6. SELF-ORGANIZATION

During the last century the invisible hand became the central idea in WN for economists, who also increasingly analyzed this work in terms of equilibrium theory, Pareto optimality and perfectly rational agents acting on purely self-interested

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(Stewart 1829, 2: 299-300; italics original). But unlike Smith, Stewart was not of one mind about this, since he was strongly drawn to his mentor Thomas Reid's Baconian inductivism.

<sup>21</sup> It is unfortunate that in his 1998 book *Consilience*, as Gould points out in a long critique (2003a), E.O. Wilson makes 'consilience' the name for 'a program that directly contradicts' Whewell's (ibid. 203). Wilson advocates a 'deliberate, systematic linkage... across the disciplines' (1998: 27), whereas what Herschel and Whewell – and Smith – had in mind was the serendipitous discovery of interconnections. So it may create more confusion than clarity to call Whewell's concept and Wilson's by the same name.

<sup>22</sup> My source for the Whewell letter is Schliesser 2005b: 70, n.131. Jonathan Smith, archivist at the Trinity College Library, Cambridge, tells me that the library did not acquire a copy of the *Essays on Philosophical Subjects* until 1969; so evidently Whewell, who spent his life at Trinity, as student, professor and then Master, found AST on his own.

<sup>23</sup> On Herschel, see Darwin to Lyell (Darwin 1994, 7: 392, 423); on Whewell, see Carey 2009.

<sup>24</sup> On this, see Ruse 1989: 9-17.

<sup>25</sup> In addition to all those mentioned elsewhere in this paper, others would include Thomson 1965; Ylikoski 1995; Hull 1988; Marciano and Pellissier 2000.



motives. Leonidas Montes is surely right that none of this is what Smith had in mind (2006: 255-8).<sup>26</sup> These ideas seem off the mark with regard to IH-1, and irrelevant with regard to IH-2.

That is particularly unfortunate since there are other contemporary concepts that closely resemble spontaneous order (IH-2). Consider 'self-organization' and 'emergence', terms now used in all the sciences, physical, biological and social. 'Self-organization' entered the lexicon in the mid-twentieth century in cybernetics, then became identified with Ilya Prigogine (1984), 1977 Nobel laureate in chemistry, and later gravitated to Stuart Kauffman and the Santa Fe Institute.<sup>27</sup> Its association with Smith and the Scottish Enlightenment is clear from a book just out as I write, *Invisible Hands: Self-organization in the Eighteenth Century* (Sheehan and Wahrman 2015), and another recent title, *Sync: The Emerging Science of Spontaneous Order* (Strogatz 2003). Unfortunately the Scottish thinkers do not figure prominently in these books; nor either in a 1996 book *The Self-Organizing Economy* by Paul Krugman, who won the Nobel prize in economics in 1998 for his elegant, highly mathematical theoretical work (work that bears little resemblance to the op-ed pieces and television commentary he is known for today). Krugman cites Smith only once briefly in this book (p.3); but what little he says is worth noting:

When Adam Smith wrote of the way that markets lead their participants 'as if by an invisible hand' to outcomes that nobody intended, what was he describing but an emergent property? And examples of emergence abound in economic theory.

Krugman talks about emergent self-organizing systems like embryos and hurricanes, and describes a growing city as 'a lot like a developing embryo' (1996: 1).

Which brings me to the physicist Lee Smolin's 1997 book *The Life of the Cosmos*. Smolin's cosmological theory is based on the combined processes of natural selection and self-organization (ibid. 138); and his conclusion is that the whole universe has simply *made itself*. He cites William Paley's argument from design, that just as a clock must have a clock maker, so too, the world must have had a world maker, and this is God. Smolin argues differently. 'There is a clock maker', he says, but there is 'no city-maker'; and 'if a city can make itself, without a maker, why can the same not be true of the universe?' (1997: 299)

Rothschild does not discuss natural selection or self-organization in *Economic Sentiments* (2001),<sup>28</sup> but she grazes Smolin's point in discussing what she calls 'the modern version' of the 'argument about design': 'If the world, or the economy, is [naturally] so orderly that it *could* have been designed by a sovereign (or a planning commission)', she says, 'then there is no need for *actual* designs (or commissions)...Why therefore should we have a planner?' (2001: 139; italics original) Robert Nozick makes a similar point in saying simply (1974: 19) that invisiblehand explanations are 'more satisfying' than those in terms of conscious human design. He does think there may be times when 'something that can arise by an invisible-hand process might better arise or be maintained through conscious intervention' (1994: 314). Still, there may be no need to posit an either-or dichotomy between the two; perhaps, as Lee Cronk suggests (1988: 302, n.5), both spontaneous and planned orders fall along a 'continuum'.

Not having access to natural selection or self-organization, Smith could only point to some 'unknown principle', as he does at least twice in WN (II.iii.31: 343, IV.ix.28: 674). He seems to have sensed that a real explanation would have to await later developments, and that his term 'invisible hand' was merely a placeholder for such an explanation (Carey 2011: 231). That said, his work on the invisible hand idea helped pave the way for later developments of the first importance, and Whewell, Darwin and recent self-organization theorists have acknowledged his contribution to their

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<sup>26</sup> Montes (2004; 2006) traces the association of Smith with equilibrium theory to Joseph Schumpeter, who credited Leon Walras (1834-1910) with the discovery.

<sup>27</sup> Darwin expressly left room for other evolutionary processes, saying at the conclusion of the *Introduction to the Origin* (1991: 4), 'I am convinced that Natural Selection has been the most important but not the exclusive means of modification'.

<sup>28</sup> Rothschild discusses 'evolved orders' (2001: 146-53) in terms of 'the equilibrium version of the modern invisible hand'; her only mention of Darwin (248) concerns Engels' evolutionary view of class struggle. And with regard to Hayek as representing 'the evolutionary version of the invisible hand', she dismisses his view of the emergence of 'rules and conventions whose significance and importance we largely do not understand' as somehow 'very far, here, from Adam Smith' (147).



own thinking. This recognition may be scantier than we would like, but scientists do not often give much credit, understandably, to non-scientists.

The editors of TMS say 'commentators have laid too much stress on the term "invisible hand"' (Intro. 7); and they have a point, considering how little it tells us. But when you think about it, how informative is 'natural selection' or 'spontaneous order' or 'self-organization'? As I said at the outset, it is not the terms, but the ideas they represent, that is important.

One thing I have tried to show here is that Smith's most celebrated idea – whether we label it 'invisible hand' or 'spontaneous order' or 'self-organization', etc. – has a bona fide place in the history of science and scientific method. And given the importance he placed on 'the connecting principles of nature' (AST II.12: 45), and what A.L. Macfie identifies as his overarching goal (1971: 598-9), a 'comprehensive, interrelated system of thought – his interpretation of the "great system of nature"', I can hardly think of anything that would have pleased Adam Smith more.

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