

Articoli/6

## *Natural Theology and the Origin of Instincts*

### **Debating the Divine Government of Animals in Early Nineteenth-Century Britain**

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In recent years, Robert M. Young's well-known description of natural theology as the «common context» which in early nineteenth-century Britain sanctioned the alliance between science and religion has been questioned in many respects. In what follows, Young's view is further discussed by focusing on the study of animal faculties. First, I contend that in the first half of the century there could be extensive disagreement over the manner in which the deity governed animal behavior. Secondly, by presenting the perspective of Henry Brougham (1778-1868) I argue that natural theology was now more willing to ascribe to animals some degree of intelligence. Finally, I provide some considerations on the importance of these developments for the emergence of the evolutionary explanations of animal faculties.

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#### **1. Fragmenting the «Common Context»**

In a seminal 1969 address, historian of science Robert Young defined natural theology as the «common context» which in early nineteenth-century Britain sanctioned the alliance between science and religion<sup>1</sup>. At the time, he argued, every scientific discovery was understood within an interpretative framework in which both the existence and the attributes of God could be derived from the study of nature. This common context would later be «fragmented» by the advancements of secular science culminated in the publication of Darwin's *Origin of Species* (1859). Thenceforth, Victorian culture would witness a significant

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<sup>1</sup> R.M. Young, *Natural Theology, Victorian Periodicals, and the Fragmentation of a Common Context*, in C. Chant, J. Fauvel (ed. by), *Darwin to Einstein: Historical Studies on Science and Belief*, Harlow 1980, pp. 69-107.

separation of science from its early theological background, and the beginning of a potentially conflictual relationship between science and religion.

Today, the historiographical view of natural theology as «common context» is generally (and often unconsciously) taken for granted by scholars who write in support of Darwinism from an atheist or agnostic standpoint. In this case the depiction of natural theology as perfectly widespread and unchanging over the decades is functional to the portrayal of Darwinism as subversive of theological systems and religious beliefs. To give an example, evolutionary psychologist Steve Stewart-Williams has recently argued:

Before 1859, science seemed only to strengthen the design argument. It revealed a universe with vastly more order and intricacy than anyone had expected to find: the clockwork precision of the orbit of the planets, the minute detail found in biological structures, the mathematical beauty and economy of the physical laws knitting together the universe. In revealing these hidden wonders, science increased people's awe at God's craftsmanship and ingenuity. [...] This was the case, at least, until Darwin came along and stole the spotlight<sup>2</sup>.

Another assumption which underlies accounts of this sort is that nineteenth-century natural theology was perfectly epitomized by what we now regard as its most popular expression, namely William Paley's *Natural Theology* (1802). Some scholars, for example, have described the eight *Bridgewater Treatises* (1833-34), centred as they were on the analogy between natural bodies – especially biological structures – and the products of human craftsmanship, as the mere «fine-tuning» of Paley's theological perspective<sup>3</sup>.

In more recent years historians have significantly downplayed this view of pre-Darwinian natural theology. While it may be reasonably argued that the relationship between science and religion was less controversial in the first half of the century than in the second, yet the context of early nineteenth-century natural theology was not as straightforwardly uniform as Young and others have assumed.

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<sup>2</sup> S. Stewart-Williams, *Darwin, God and the Meaning of Life: How Evolutionary Theory Undermines Everything You Thought You Knew*, Cambridge 2010, pp. 47-48. A similar point of view may be found in R. Dawkins, *The Blind Watchmaker*, Harlow 1986, p. 6; D.C. Dennett, *Atheism and Evolution*, in *The Cambridge Companion to Atheism*, ed. by M. Martin, Cambridge 2007 (see esp. pp. 147-148); V.J. Stenger, *God: The Failed Hypothesis: How Science Shows that God Does not Exist*, London 2007, esp. pp. 47-52; A. Attanasio, *Darwin. Emozione, Coscienza, e Disegno divino*, in C. Darwin, *Taccuini filosofici. Taccuini «M» e «N», Note sul senso morale, Teologia e selezione naturale*, ed. by A. Attanasio, Torino 2010, pp. VII-LIX. Natural theology has been described as a «Kuhnian paradigm» by evolutionary biologist M. Pigliucci, *Biology's Last Paradigm Shift: The Transition from Natural Theology to Darwinism*, in «Paradigmi», XXX, 2012, pp. 45-58. The same idea of the impact of Darwinism on natural theology may be found in several contributions by F.J. Ayala, e.g. *Darwin's Explanation of Design: From Natural Theology to Natural Selection*, in «Infection, Genetics and Evolution», X, 2010, pp. 840-843.

<sup>3</sup> This thesis is contended for in D.W. Gundry, *The Bridgewater Treatises and their Authors*, in «History», XXXI, 1946, pp. 140-152, and P. Addinall, *Philosophy and Biblical Interpretation: A Study in Nineteenth-Century Conflict*, Cambridge 1991.

To begin with, it is now clear that Paley's point of view was not nearly as generally accepted as such accounts seem to imply. There were several theologians in Britain who seriously doubted that natural theology could be invested with the apologetic importance it had played in Paley's system. In Cambridge many were alarmed by the kinship between the argument from design and philosophical deism, which was precisely one of those perspectives repudiated by orthodox theology as materialistic and irreligious<sup>4</sup>. Others (e.g. William Irons) were similarly concerned that an overemphasis on the natural evidence of God's existence could weaken the devotee's reliance on the Scripture: from their point of view, natural theology was apologetically not only unserviceable but dangerous. What is more, quite differently from Paley, several of the authors of the *Bridgewater Treatises* made it clear that, while they were looking for the "wisdom of God" in the expediciencies and contrivances of nature, they were not providing a formal "proof" of God's existence. Rather, in their eyes it was the devotee's prior faith in God that allowed to see his hand at work in natural processes<sup>5</sup>. Last but not least, some theological thinkers utterly rejected the anthropomorphic propensities of natural theology, pointing at the mysteriousness of creation as the most fundamental element around which a new theological creed should be established. This stance on natural theology is well exemplified by an anonymous review appeared on the radical weekly *The Leader*, where the attempts to detect the hand of God in nature and history were denounced as no less than «blasphemies»<sup>6</sup>.

If we confine our analysis to the works of those who wrote in support of natural theology, we find extensive disagreement concerning how they conceived God's design. As a matter of fact, the notion of a God-craftsman was being replaced by the idea that God's design resided in the general plan rather than in the minute details of nature. Such plan could reside either in the structural unity of the living, as for Richard Owen, or in the constancy of the laws governing natural phenomena. Quite evidently, the latter point of view – promoted by two

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<sup>4</sup> Cf. A. Fyfe, *The Reception of William Paley's Natural Theology in the University of Cambridge*, in «British Journal for the History of Science», XXX, 1997, pp. 321-335.

<sup>5</sup> Cf. T. Chalmers, *On the Power, Wisdom, and Goodness of God as manifested in the Adaptation of External Nature to the Moral and Intellectual Constitution of Man*, London 1833, vol. II, pp. 269-271, 290; J. Kidd, *On the Adaptation of External Nature to the Physical Condition of Man*, London 1833, pp. VIII-IX; W. Whewell, *Astronomy and General Physics considered with reference to Natural Theology*, London 1833, pp. 343-344. On the publication and reception of the *Bridgewater Treatises* cf. J.R. Topham, *Science and Popular Education in the 1830s: the Role of the "Bridgewater Treatises"*, in «British Journal for the History of Science», XXV, 1992, pp. 397-430; Id., *Beyond the "Common Context": The Production and Reading of the "Bridgewater Treatises"*, in «Isis», LXXXIX, 1998, pp. 233-262; Id., *Biology in the Service of Natural Theology: Paley, Darwin, and the "Bridgewater Treatises"*, in *Biology and Ideology from Descartes to Dawkins*, ed. by D.R. Alexander, R.L. Numbers, Chicago-London 2010, pp. 88-113.

<sup>6</sup> *The Hand of God in History*, in «Leader», II, 1851, p. 109. On the theology of the *Leader* see M. Francis, *Herbert Spencer and the Invention of Modern Life*, Stocksfield 2007, chap. VII, and F. Morganti, *Evoluzionismo e teologia naturale: il caso di Herbert Spencer*, in «Esercizi filosofici», IX, 2014, pp. 27-42 (esp. pp. 31-36).

influential authors as Robert Chambers and Baden Powell<sup>7</sup> – was far from hostile towards an evolutionary understanding of natural processes<sup>8</sup>. It may be added that even Charles Darwin had been initially friendly towards the conception of “design by natural laws”<sup>9</sup>.

Interestingly enough, the same plurality may be observed by focusing on a more limited subject such as the study of animal faculties and the problem of animal instincts. On the one hand, all natural theologians agreed on the divine origin of instincts. The operations of animals, they argued, were too well adapted to external circumstances, too uniform among the members of the same species, and too perfectly developed at birth to be attributed to experience or to the intellectual faculties of animals (provided they possessed them at all). Animal instincts revealed so perfect a design – i.e. a correspondence of means to ends – that in no way could it have been conceived by the mind of the animal. In other words, instincts amounted to a form of intelligence that outclassed the intellectual skills of animals, being the product of that higher intelligence responsible for the very existence of animal creation.

Virtually every natural theologian accepted this conception of instinct. Some version of the above line of argument may be found in the works of William Paley, John Fleming, Thomas Hancock, Alexander Crombie, Algernon Wells, John Macculloch, Henry Brougham, and others, while being still largely accepted in encyclopaedias<sup>10</sup>. The same view had also belonged to many eighteenth-century authors: not only natural theologians such as John Ray, William Derham, and Joseph Addison, but also philosophers of very different perspectives such as Charles Bonnet, Hermann Reimarus, and Thomas Reid. And it should not be forgotten that Isaac Newton had asserted that animals instincts «can be the effect of nothing else than the wisdom and skill of a powerful

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<sup>7</sup> On Chambers and Powell see respectively J.A. Secord, *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of “Vestiges of the Natural History of Creation”*, Chicago-London 2000, and P. Corsi, *Science and Religion: Baden Powell and the Anglican Debate (1800-1860)*, Cambridge 1988 (trans. It. *L'evoluzionismo prima di Darwin. Baden Powell e il dibattito anglicano, 1800-1860*, Brescia 2014).

<sup>8</sup> On nineteenth-century British natural theology cf. J.H. Brooke, *Natural Theology and the Plurality of Worlds: Observations on the Brewster-Whewell Debate*, in «Annals of Science», XXXIV, 1977, pp. 221-86; A. Fyfe, *Publishing and the Classics: Paley's “Natural Theology” and the Nineteenth-Century Scientific Canon*, in «Studies in History and Philosophy of Science», XXXIII, 2002, pp. 729-751; J.C. Livingstone, *Natural Sciences and Theology*, in D. Fergusson (ed. by), *The Blackwell Companion to Nineteenth-Century Theology*, Oxford 2010, pp. 141-164.

<sup>9</sup> Cf. for instance P. Casini, *Darwin e la disputa sulla creazione*, Bologna 2009. Among the massive literature on Darwin's impact on natural theology see also P.J. Bowler, *Darwinism and the Argument from Design: Suggestions for a Reevaluation*, in «Journal of the History of Biology», X, 1977, pp. 29-43; D. Ospovat, *The Development of Darwin's Theory: Natural History, Natural Theology, and Natural Selection, 1838-1859*, Cambridge 1981; D. Kohn, *Darwin's Ambiguity: The Secularization of Biological Meaning*, in «British Journal for the History of Science», XXII, 1989, pp. 215-239; A. La Vergata, *Lequilibrio e la guerra della natura. Dalla Teologia naturale al darwinismo*, Napoli 1990.

<sup>10</sup> Cf. for instance *Instinct*, in *The Cyclopaedia; or, Universal Dictionary of Arts, Sciences, and Literature*, ed. by A. Rees, London 1819-20, vol. XIX, 1819 (unpaged); W.P. Alison, *Instinct*, in *The Cyclopaedia of Anatomy and Physiology*, ed. by R.B. Todd, London 1836-59, vol. III, 1847, pp. 1-29.

ever living agent, who being in all places, is more able by his will to move the bodies within his boundless uniform sensorium [...] than we are by our will to move the parts of our own bodies»<sup>11</sup>.

However, in the first half of the nineteenth century natural theologians began to experience substantial disagreements over the manner in which the deity concretely directed animal behaviour by means of instinct. Was God directly controlling animal bodies the way he controlled physical bodies by means of gravitation – as implied by Newton's statement – or was he operating by means of intermediary causes? Were these causes metaphysical or physical in character? Could they be expressed in terms of general laws or not? Each of these possibilities seemed to solve important theological concerns on one side, while it opened different problems on the other. Also, beside these more genuinely theological difficulties, natural theologians began to pay more attention to the psychological side of the issue. Compared to the previous century, they were now apparently more willing to ascribe to animals some degree of intelligence. Theologically speaking, this was not without consequences, since to credit animals with intelligence was to admit that their activity was to some extent released from God's direct interposition. This in turn raised the further difficulty of establishing reliable criteria with which to relate specific behaviours either to the instinctive or to the rational faculty. What is more, among the many who assigned to animals a certain degree of intelligence there were some who believed that between the intelligence of animals and that of humans there was, after all, only a difference of degree.

The acceptance of what I shall refer to as the hypothesis of animal intelligence can be largely seen as an attempt to digest the more radical scientific and philosophical theories mostly elaborated on the continent. John Brooke has convincingly argued that nineteenth-century British natural theology was characterized by the attempt to assimilate within a theologically sustainable framework the secular science developed in France, e.g. by Laplace, Lamarck, and Saint-Hilaire<sup>12</sup>. It is reasonable to assert that this very process of assimilation affected the study of animal mind as well. In the first half of the century we find several sensationalist, associationist, and even transformistic assumptions circulating in the theological literature on animal faculties. This may be seen as a reaction to the philosophies of Condillac, Helvétius, Hume, Erasmus Darwin, William Smellie, and others. In the eyes of natural theologians these authors had placed too much importance on the faculties of animals and had thus disregarded God's role in the supervision of animal behaviour. Accordingly, they needed to show that those assumptions, including the hypothesis of animal intelligence, could be accepted without substantially altering the general frame of natural theology.

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<sup>11</sup> I. Newton, *Opticks: or, A Treatise of the Reflections, Refractions, Inflections and Colours of Light*, 3<sup>rd</sup> ed., London 1721, p. 379.

<sup>12</sup> Cf. J.H. Brooke, *Scientific Thought and its Meaning for Religion: The Impact of French Science on British Natural Theology, 1827-1859*, in «Revue de synthèse», CX, 1989, pp. 33-59.

In what follows I will offer, with the above considerations in mind, a sketch of the study of animal mind in early nineteenth-century Britain. Also, in the fourth and last section I will provide some considerations on the importance of these developments of natural theology for the emergence of the evolutionary explanations of animal faculties, which seem to call for an adjustment of the image of evolutionary thinking as mere subversion of natural theology.

## **2. Some Explanations of God's Superintendence of Instincts: John Oliver French and William Kirby**

From March to October 1824 the *Zoological Journal* published a long essay entitled *An Inquiry respecting the True Nature of Instincts*. The author was John Oliver French<sup>13</sup>, a naturalist and natural theologian who supported a rather orthodox view of instincts. Nature, he argued, exhibited throughout its operations clear signs of a moral and intellectual agency for which no particular aggregation of matter nor natural phenomenon could be held responsible. This was true even of that portion of nature which at first sight may seem to act independently from God's decrees, i.e. the so-called «brute creation»; as a matter of fact, it was precisely in the instinctive operations of animals that God's moral and intellectual purposes were most evident.

French's argument was far from original. Since animals were evidently unable to conceive the moral and intellectual qualities they exhibited in their behaviours, nor the purposes they were attaining, there followed that those qualities and purposes had been established by a higher power endowed of both morality and intelligence. The activity of such power was the only hypothesis which could adequately account for the sagacity, the moral character, and the purposiveness of instincts. And yet, how did the deity factually superintend the actions of animals?

According to French, two were the extremes equally to be avoided. On the one hand, there were those – such as Helvétius and Erasmus Darwin – who had credited animals with the same faculties of humans. On the other, there were those who had seen animal instincts as the immediate manifestation of divine agency. The latter, French noticed, had been the opinion of English essayist Joseph Addison (1672-1719), who had written in support of the orthodox view of instinct in two papers appeared in July 1712 in Addison's own daily *The Spectator*<sup>14</sup>. In those pages Addison had quarrelled against the attribution of reason to animals, defending the idea that the apparent sagacity of animals could be exclusively the result of God's providence. The thesis that animal instincts were the effect of God's direct agency had been contended for also in the 31<sup>st</sup> Query of Newton's *Opticks*. Addison was probably aware of Newton's opinion,

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<sup>13</sup> Unfortunately, I have not been able to uncover any biographical information on this author, nor to my knowledge has anybody else.

<sup>14</sup> Cf. *The Works of the Right Honourable Joseph Addison*, ed. by R. Hurd, 6 vols., London 1844-46, vol. II, 1844, pp. 457-464.

as he explicitly suggested that God's held to instinct the same relation he held to gravitation.

There is not, in my opinion, anything more mysterious in nature than this instinct in animals [...]. It cannot be accounted for by any properties in matter, and at the same time works after so odd a manner, that one cannot think it the faculty of an intellectual being. For my own part, I look upon it as upon the principle of gravitation in bodies, which is not to be explained by any known qualities inherent in the bodies themselves, nor from any laws of mechanism, but, according to the best notions of the greatest philosophers, is an immediate impression from the first mover, and the Divine Energy acting in the creatures<sup>15</sup>.

The analogy between instinct and gravitation – which was destined to achieve a certain popularity in the following century<sup>16</sup> – was meant to indicate that instinct, not differently from Newton's principle, was to be understood as an ultimate property of bodies, which could explain certain phenomena while being unsusceptible of further explanation.

Yet, apart from agreeing on the general idea of God's responsibility in contriving animal instincts, not everyone was willing to accept the notion of God's immediate action on animal bodies<sup>17</sup>. According to the German deist Hermann Reimarus (1694-1768), Addison's hypothesis was contradicted by the fact that in performing their instincts animals could sometimes err. He believed that «those imperfections in the operations of animals, as well as in ours, have their true source in the limited forces of nature»<sup>18</sup>. From this point of view, the deity had created every kind of natural bodies, including animals, only to subsequently withdraw himself from creation.

French was similarly concerned about Addison's conception, but for different reasons. The price of ascribing instincts to the immediate action of the deity, he argued, was that of reducing animals to «perfect automata», overlooking «that sense of life and existence derived from the class of conscious powers which it is evident they possess, and which manifestly constitutes the enjoyment of sentient being»<sup>19</sup>. French praised Addison for correctly acknowledging that the purposiveness of instincts could not be the result of organization. Yet, he criticized him for not admitting that animals were more than mere machines. The *via media* between Addison's solution and the hypothesis of animal intelligence was the postulation of indirect control exercised by the deity upon animals. The

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<sup>15</sup> *Ibid.*, p. 460.

<sup>16</sup> The analogy is alluded to, for example, in T. Hancock, *Essay on Instinct, and Its Physical and Moral Relation*, London 1824, p. 9; J. Mason Good, *The Book of Nature*, London 1826, vol. III, pp. 11-17; H. Brougham, *Dissertations on Subjects of Science connected with Natural Theology: Being the concluding volumes of the New Edition of Paley's Work*, London 1839, vol. I, pp. 64-68.

<sup>17</sup> Perhaps it should be added that Newton himself had not been so straightforward on the relationship between God and gravity as some later readers have implied.

<sup>18</sup> H.S. Reimarus, *Observations physiques et morales sur l'instinct des animaux, leur industrie e leurs moeurs*, 2 vols., Amsterdam 1770, vol. II, p. 21.

<sup>19</sup> J.O. French, *An Inquiry respecting the True Nature of Instincts, and of the Mental Distinction between Brute Animals and Man*, in «Zoological Journal», I, 1824, p. 5.

manner in which French conceived such intermediary agency is well epitomised by the following quote:

Certain it is, from the wondrous indications of moral design, intellect, and science, discoverable in the actions of brute animals, that [...] we must allow them to possess only a subordinate consciousness and discrimination determinable to natural objects; and overruled and directed by powers or agencies operating in them above the sphere or stream of their own proper consciousness, and which powers or agencies must be of a moral, intellectual, and scientific order: thus that brutes are governed by such agencies, good and evil, but under the control of Providence; and that such agencies act by impressions upon their conscious nature, but unperceived by it in a moral or intellectual sense; effecting such operation by means of connate inclinations implanted in their nature, and disposing them to receive the impressions; and which inclinations appear to constitute the ground or basis upon which is formed that lower species of consciousness, volition, and discrimination, which seems the proper attribute of the brute animal<sup>20</sup>.

French was here postulating two opposing non-physical agencies respectively good and evil, i.e. angelic and demonic. He believed that only a double agency of this sort could account for the «mixed nature» of animals such as the sea lion, «the males of which species manifest the most singular tenderness towards their young progeny, and at the same time a savage and persecuting disposition towards their females»<sup>21</sup>. Again, he made it clear that, while they displayed some moral purpose, animals could be considered neither responsible for nor aware of those purposes. To be sure, they could be credited with a «natural» form of freedom, but not with the moral and intellectual form which, conversely, belonged exclusively to humans. To attribute humanlike faculties to animals would have rendered the bee «a perfect political moralist», and the cuckoo a rival of the most refined philosophers<sup>22</sup>.

Animals were thus entirely devoid of intelligence: the relation between instinct and intelligence was not of affinity but, as Reimarus had argued, merely of analogy. Both faculties implied the adoption of certain means to the pursuit of certain ends; yet, in the case of instinct the correspondence of means to ends was too perfect to be the result of animal intelligence, being rather a sign of God's intelligent plan. Accordingly, reason could be defined as «a deduction of intellect within the conscious perception of the subject whose actions exhibit it», while instinct amounted to «a similar deduction of intellect, not within, but above the conscious perception of the subject whose actions exhibit it»<sup>23</sup>.

A decade later, a rather different stance on the subject would be offered by William Kirby (1759-1850) in his own *Bridgewater Treatise*, entitled *On the Power, Wisdom, and Goodness of God as manifested in the Creation of Animals, and in their History, Habits, and Instincts* (1835). Kirby's general purpose was to

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<sup>20</sup> *Ibid.*, pp. 6-7.

<sup>21</sup> *Ibid.*, p. 7.

<sup>22</sup> *Ibid.*, p. 12.

<sup>23</sup> *Ibid.*, pp. 26-27.



reconcile «the study of the *word* of God with that of his *works*»<sup>24</sup>. Quite distant from Paley, he belonged to those British naturalists whose main response to scientific progress was that of reinterpreting the Scripture in the light of the latest discoveries. In Kirby's own *Bridgewater* – not differently from the others – the attempt to “prove” the existence of God from the study of natural sciences was entirely absent. He believed that while the understanding of God's design was utterly impossible, it was nonetheless human duty to seek the divine in the unfolding of natural processes:

I shrink into very nothingness, when I reflect that such a miserable worm as I am, so fallen and corrupted, should presume to lift its thought so high, and lose itself in the depths of the unfathomable ocean of Deity. He has, however, commanded us to seek him, and assured us we shall find him if we seek him humbly and sincerely – he hath set before us his works and his words, in both of which he has revealed himself to us<sup>25</sup>.

Affiliated to the High Church, Kirby was alarmed by the possible social consequences of the circulation of French materialistic science. Yet, reluctant to take part in the political dispute, he took up the study of natural sciences and entomology, thus fighting a rear-guard battle. Kirby's scientific ideal, interested as he was in conveying a theologically reassuring view of the new science, was perfectly embodied by the project of the *Bridgewater Treatises*. In his mind the very idea of “innovation” was intimately connected to social change and to the overturning of the *status quo*. Accordingly, in opposition to the philosophy of “second causes” – e.g. those endorsed by Laplace and Lamarck – he promoted a philosophy in which nature was organized hierarchically and God had full control of creation. The subject of instinct would prove ideal to the purpose.

Not differently from many other naturalists and natural theologians, Kirby believed that there was «no department of Zoological Science that [furnished] stronger proofs of the being and attributes of the Deity, than that which relates to the instincts of animals»<sup>26</sup>. He accepted the classical view of instinct as an “infusion” of knowledge operated by the deity. Referring to what was probably the most commonly employed instance of animal instincts – and later crucial testing-ground of Darwin's theory of natural selection<sup>27</sup> – he observed that bees were able to build a perfectly hexagonal cell only because taught «by an infallible teacher»<sup>28</sup>. As for French, his main problem was therefore that of ascertaining the actual instruments of God's government of animal behaviour.

Addison's supposition of God's immediate presence in the mind of animals was «contrary [...] to the general plan of Divine Providence, which usually

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<sup>24</sup> W. Kirby, *On the Power, Wisdom, and Goodness of God as manifested in the Creation of Animals, and in their History, Habits, and Instincts*, 2<sup>nd</sup> edit., London 1835, vol. I, p. xviii.

<sup>25</sup> *Ibid.*, p. 231.

<sup>26</sup> *Ibid.*, II, p. 220.

<sup>27</sup> See F. Prete, *The Conundrum of Honey Bees: One Impediment to the Publication of Darwin's Theory*, in «Journal of the History of Biology», 33, 1990, pp. 271-290.

<sup>28</sup> W. Kirby, *On the Power, Wisdom, and Goodness of God*, cit., II, p. 237.

produces effects indirectly, and by the intervention and action of means or secondary causes»<sup>29</sup>. Like Reimarus, he was also of the opinion that Addison's hypothesis did not account for the existence of errors. While undoubtedly «all instincts are from God», yet «if God were [animals'] *immediate* instructor, would it be possible for the flesh-fly, as I have seen that she does, to mistake the blossom of the carrion-plant for a piece of flesh, and lay her eggs in it; or for a hen to sit upon a piece of chalk, as they are stated to do, instead of an egg?»<sup>30</sup>. Nor was the problem solved by French's intermediate intelligence; as a matter of fact, the occurrence of mistakes was incompatible with the action of any heavenly intelligence. In addition, Kirby saw as entirely irrational the idea that animals were alternatively under the dominance of a good and an evil agency – that a bee, for example, could act by the interposition of a good agency when collecting pollen, and of a bad agency when stinging an enemy.

Kirby believed that instincts «invariably follow the development of the organization; are neither the result of instruction, nor of observation and experience, but the action of some external agency upon the organization, which is fitted by the Omniscient Creator to respond to its action»<sup>31</sup>. As instincts could not be the effect of God's direct interposition nor of some intermediate intelligence, he proposed that God made use of a number of physical agencies – namely light, fire, and air – which were biblically symbolized by the cherubim, i.e. the four-face and four-wing creatures recurrently described in the Old and New Testament (e.g. Ez 1,6; Ap 4,7-8). By operating on the brain and nerves of animals, those physical agencies were thus responsible for the execution of instinctive behaviours. Interestingly enough, Kirby conceded that God could occasionally «suspend» the regularity of this physical action on the mind of animals, allowing the influence of their own faculties, including intellect: «Sight, hearing, scent, taste, touch, perception, influence the will, and direct each animal to the points in which its instinctive actions are to commence; and so far instinct is, as it were, *mixed* with intellect»<sup>32</sup>. He then added that intellect was

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<sup>29</sup> *Ibid.*, p. 230.

<sup>30</sup> *Ibid.*, p. 231.

<sup>31</sup> *Ibid.*, p. 238. Long before the appearance of his own *Bridgewater Treatise*, Kirby had co-authored – with William Spence (1783-1860) – the renowned *Introduction to Entomology* (1815-26). Curiously enough, that work had offered a rather different definition of instinct. While that work equally assumed the idea of instinct as the product of God's design, in the chapter expressly dedicated to instincts one could perceive how that idea was considered as nothing more than a «confession of ignorance». In other words, in that case – differently from Kirby's *Bridgewater* – the idea of instincts as «unknown faculties implanted in their constitution by the Creator» did not constitute a positive statement on the nature of that faculty. Such contrast is easily explained by the fact that the chapter on instinct of the *Introduction* was written by Spence ALONE, who was closer to an empiricist view of science, which in his eyes should be as free from theological assumptions as possible. In the chapter on instinct of his own *Bridgewater*, Kirby would write: «It is not without considerable reluctance that the author of this essay takes the field, in some degree, against his worthy friend and learned coadjutor» (*op. cit.*, vol. II, p. 222). On Kirby and Spence see J.F.M. Clark, *History from the Ground Up: Bugs, Political Economy, and God in Kirby and Spence's "Introduction to Entomology" (1815-1856)*, in «Isis», XCVII, 2006, pp. 28-55.

<sup>32</sup> W. Kirby, *On the Power, Wisdom, and Godness of God*, cit., vol. II, p. 278.

to instinct what repulsion was to gravity, i.e. a principle of limitation capable of determining the conduct of sentient beings as the latter did with inorganic bodies.

What lesson can we draw from Kirby? His quarrel with French was emblematic of a concern that natural theologians had with the apparent imperfections of animals behaviours. This was a problem of theodicy. Not differently from others, Kirby believed that distancing God from his own creation – that is, tolerating a certain amount of autonomy in nature – was a way to relieve him from the responsibility for the imperfections which would inevitably and spontaneously occur. At the same time, his hypothesis of intermediate physical agencies as an explanation of animal instincts should be seen as a reaction towards Laplace's and Lamarck's philosophies of nature. In accepting the idea of mundane agencies acting on the nervous system of animals, Kirby was in fact arguing that the study of natural causes *per se* did not amount to a neglect of God's superintendence of the world. The whole point of Kirby's introductory analysis – not to the say of the *Bridgewater Treatises* in general – was the rejection of the "philosophy of secondary causes" and its attempt to dispense with God's active role in the unfolding of natural processes. At the same time, scientific analysis required that some distance be set between God and nature, in order to allow the very inquiry into the laws of nature which was at the core of scientific enterprise, and which no credible theology of nature could do without.

It may be argued that this was a quite unstable compromise. God operated by means of secondary causes, yet he was not responsible for the occurrence of imperfections; laws of nature were independent enough to be the object of scientific study, yet they ought to be seen as the result of God's providential plan. The boundary between God and nature was, to say the least, still uncertain.

Few years later, a completely different answer to the problems raised by the study of animal faculties would be provided by he who may be regarded as the most important scholar of animal psychology of the first half of the nineteenth century, i.e. British statesmen Henry Brougham. As we shall see, Brougham would retrocede to a Newtonian-like view of God's government of animal instincts, but at the same time his conception would prove much more radical, and to some extent more secular, than any natural theology had been before.

### 3. Henry Brougham and the Hypothesis of Animal Intelligence

Paley's *Natural Theology* was not without its readers and supporters. Between 1835 and 1839 Scottish physician Charles Bell (1774-1842) – formerly author of the fourth *Bridgewater Treatise* – and British statesman Henry Brougham (1778-1868) coedited a new illustrated edition of Paley's book. The two-volume new edition was preceded by *A Discourse of Natural Theology* (1835) and followed by the two-volume *Dissertations on Subjects of Science connected with Natural Theology* (1839) both written by Brougham. Brougham was a Whig politician who had been one of the founders of the *Society for the Diffusion*

of the *Useful Knowledge* (1826), before serving as Lord Chancellor under the government of Charles Grey (1830-34). In the 1830s he was pleased by the success of the *Bridgewater Treatises*, in which he saw a form of theologically safe science which could serve the purpose of educating the lower classes. As explained by J.R. Topham, in his eyes the *Bridgewater* provided «a working epitome of contemporary science, uncorrupted by radical ideas, and set out in a relatively systematic and introductory form – exactly the sort of meat which the Broughamites thought would produce rationality, respectability and religion among the working classes»<sup>33</sup>.

In the *Discourse* Brougham defended the idea of natural theology as a necessary auxiliary to revealed theology: «All the soundest arguments in behalf of the latter presuppose the former to be admitted»<sup>34</sup>. The miracles on which the latter is based could be due to «fraud or malice», and thus could never constitute alone a solid foundation of Christian theology. Those miracles could be the proof solely of some supernatural powers, without representing in themselves a testimony of either the wisdom or the goodness of their author. Accordingly, «it is plain that no sufficient evidence can ever be given by direct Revelation alone in favour of the great truths of religion»<sup>35</sup>.

The main thesis of the *Discourse* was the exact coincidence between the inductive inquiry and the inference of design. For instance, the scientific facts constituting the anatomical knowledge of the eye were proofs of intelligent adaptation to light *per se*, and the same held for the most important truths of anatomy and natural history. Once established that certain structures served certain purposes, the existence of an intelligently ordered plan was already ascertained, without requiring further argumentative passages.

These are facts learnt by induction; the inductive science of dynamics shows us that such mechanism is calculated to answer the end which, in point of fact, is attained. To conclude from thence that the mechanist contrived the means with the intention of producing this end, and with the knowledge of the science, is also strictly an inference of induction<sup>36</sup>.

Needless to say, the same held for instincts<sup>37</sup>. Brougham regarded instincts as mental phenomena «wholly unconnected with any exercise of animal reason»<sup>38</sup>.

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<sup>33</sup> J.R. Topham, *Science and Popular Education in the 1830s*, cit., p. 420. On Brougham's effort to popularize science among the lower classes see J.G. Crowther, *Statesmen of Science*, London 1965, pp. 9-73. On his philosophical approach cf. G.N. Cantor, *Henry Brougham and the Scottish Methodological Tradition*, in «Studies in History and Philosophy of Science», II, 1971, pp. 69-89. Lastly, for an analysis of the *Discourse* and its reception cf. J.D. Yule, *The Impact of Science on British Religious Thought in the Second Quarter of the Nineteenth Century*, Ph.D. thesis, Cambridge 1976, pp. 187-235.

<sup>34</sup> H. Brougham, *A Discourse of Natural Theology, showing the Nature of Evidence and the Advantages of the Study*, London 1835, p. 202.

<sup>35</sup> *Ibid.*, p. 207.

<sup>36</sup> *Ibid.*, p. 37.

<sup>37</sup> *Ibid.*, pp. 56-68.

<sup>38</sup> *Ibid.*, p. 73.

While animals were not entirely devoid of reason, the rationality intrinsic to their instincts was something for which only the deity could be responsible. In each particular case, deciding whether a certain behaviour was due to instinct or to reason might not be an easy task. Yet, in principle, the distinction between the two faculties was unquestionable. Rational actions were described as those «which vary with circumstances novel and unexpectedly varying; they imply therefore the adaptation of means to an end, and the power of varying those means when obstacle arise»<sup>39</sup>. Conversely, pure instincts had nothing to do with the faculty of reason and were thus to be considered as cogent proofs of design. Bee-cells, for instance, were the same in every part of the world, equally perfect and equally crucial to the survival of the species. Their perfection was obviously due to such a geometrical ability that could belong to nobody else but the creator of the bees. Again, the inference from nature to design was implied in the very observation of instincts: «The process of reasoning is not like, but identical with, that by which we infer the existence of design in others (than ourselves) with whom we have daily intercourse. The kind of evidence is not like, but identical with, that by which we conduct all the investigations of intellectual and natural science»<sup>40</sup>. This amounted to saying that to infer God's plan from the observation of nature was epistemologically identical to inferring an intentional mind from any other purposive human behaviour. By the same token, one could not deny the existence of design without doubting the very existence of the mind of the others.

The first volume of Brougham's *Dissertations* would be entirely devoted to problems of animal psychology. That work was a long dialogue between Brougham and John Charles Spencer, Viscount Althorp (1782-1845), who had served as Chancellor of the Exchequer under the government of Charles Grey. Around 1836 between the two it had occurred an epistolary exchange precisely on the issue of instinct. Historian Joe Bord has confirmed that the content of the the letters and that of book are substantially coincident<sup>41</sup>.

In the book Brougham endorsed a rather classical distinction between instinct and reason. In acting instinctively, he wrote, «the animal works positively without knowledge and in the dark. She also works without designing anything, and yet she works to a certain defined an important purpose»<sup>42</sup>. Instincts displayed an amount of knowledge which could not have been derived from experience. Besides, instincts were infallible and uniform among the members of the same species. Rational behaviour diverged from instinctive not in grade but in kind: a rationally acting animal would operate «intending and meaning, and, in a word, designing to do what he accomplishes»<sup>43</sup>. The choice of the verb “to design” was far from accidental. Brougham was hinting at the thesis –

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<sup>39</sup> *Ibid.*, p. 75.

<sup>40</sup> *Ibid.*, p. 78.

<sup>41</sup> Cf. J. Bord, *Science and Whig Manners: Science and Political Style in Britain, c. 1790-1850*, Basingstoke-New York 2009, pp. 94-101.

<sup>42</sup> H. Brougham, *Dissertations*, cit., vol. I, p. 18.

<sup>43</sup> *Ibid.*

already contended for in the *Discourse* – according to which the epistemological warranty concerning God's design was the same as in the purposive actions of sentient individuals. Any action displaying purpose is to be referred to some sort of intelligence. Some of these actions, however, are too perfect, too sophisticated to be the product of any mundane intelligence, and they are thus accountable for only in terms of God's providential plan.

This point would soon mark the divergence between the two discussants, a divergence which we may take as representative of two different positions circulating at the time among natural theologians. Althorp did in fact endorse the view that God acted on the mind of animals by means of laws, identified in turn in the sense of "gratification" triggered by the execution of certain actions. On the other hand, by referring to the position of Newton and Addison, Brougham adopted the hypothesis of God's immediate presence in the mind of animals. What is here important to stress is the absolute consistency between Brougham's view of the divine government of instincts and his own epistemological approach to the theory of design. In his opinion, the very analogical foundation which required an explanation of natural phenomena in terms of "design" was a good reason to endorse Newton and Addison's view. He believed that the only possible warranty for the attribution of some purposive phenomenon to an intelligent cause was a comparison with one's own intelligence. But when we perceive design in ourselves, we only perceive some sort of volition or intention, rather than the operation of some law. Accordingly, in Brougham's opinion, the idea of explaining purposiveness in terms of laws, as implied by Althorp, was entirely unwarranted from an inductive point of view: for that was not the sort of design that natural philosophers were allowed to infer, nor the individuals to attribute to each other in ordinary life. Conversely, what individuals attributed to each other was the action of a mental principle, of an intelligence, directly exerting its powers during the execution of purposive behaviour. Accordingly, «we have reached the important position, that our argument for the existence of a designing cause at all in the universe rests on no better, indeed on no other foundation, that our argument that instinctive action proves an interposition of the Deity at each moment»<sup>44</sup>.

Nor Brougham found any value in the classical objection based on the occurrence of mistakes. Since God acted directly on the mind of animals, so the objection goes, he should be held responsible for those mistakes; as in the case of the flies which, mistaking the smell of the flower *Stapelia irsuta* for that of putrefying meat, lay their eggs where they cannot breed their offspring. In Althorp's opinion such mistakes were easily explained by the hypothesis of a desire implanted in the mind of the animal, «for the law would be to follow that smell, and this law is obeyed»<sup>45</sup>. And yet, since that law would still operate according to God's design, Brougham replied, the difficulty would be the same in one case as in the other. Was there not, in Althorp's hypothesis, «a defect, or

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<sup>44</sup> *Ibid.*, p. 95.

<sup>45</sup> *Ibid.*, p. 108.

imperfection in the general law, detracting, *pro tanto*, from its adaptation to work its undoubted purpose? [...] Then is it not just as inconsistent with His perfections, to believe He has made a faulty statute, as to suppose that He makes a mistake in particular cases?»<sup>46</sup>.

Brougham's position may appear rather conservative. Not only did he accepted the traditional view of instinct, but he also endorsed a rather "invasive" view of the action of the deity which, although for very precise epistemological reasons, seemed to rule out the possibility of inquiring into the laws of instinctive behaviour. Instinct, not differently from gravitation, may explain certain phenomena but was not in itself susceptible of any explanation. And yet, precisely the inductive method which he rigorously clung to would lead Brougham to endorse two controversial positions: the hypothesis of animal intelligence, and the view that between the mind of animals and that of humans there was a mere difference of degree.

As we have seen, Brougham firmly believed that instinct and intelligence were two radically distinct faculties. For this reason he rejected the positions of Erasmus Darwin and William Smellie, who had rendered the distinction between instinct and intelligence far too feeble. Because of their undeniable constancy over time, instincts could not have, as Darwin had believed<sup>47</sup>, a "traditional" origin: «The bee, 6000 years ago, made its cells as accurately, and the wasp its paper as perfectly, as they now do»<sup>48</sup>.

However, all this did not prevent Brougham from observing that intelligence was not exclusive of humans. Nearly half of the first book was in fact devoted to the issue of animal intelligence. Brougham and Althorp could easily provide a long list of instances which seemed to prove the case<sup>49</sup>. Curiously enough, one of these instances came precisely from the *Zoonomia*, where Darwin had described a wasp removing the wings of a fly it had preyed upon, in order not to be caught in the wind when carrying it; an instance which in Darwin's opinion indicated no less than «the power of reason in a wasp, *as it is exercised among men*»<sup>50</sup>.

Yet Brougham was aware that the whole issue of animal intelligence could not be settled solely by listing instances of presumed intelligent actions, requiring on the contrary the establishment of reliable criteria with which to tell intelligent from instinctive behaviours. He thus resorted to a number of empirical criteria based on the observation of the animal in either common or unusual circumstances. An action performed in ordinary circumstances could be both instinctive or intelligence. It was undoubtedly instinctive if it consisted in something which reason alone could not accomplish, as in the case of bee-cells. In other cases, it was reasonable to conclude that some degree of intelligence was

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<sup>46</sup> *Ibid.*, p. 109.

<sup>47</sup> Cf. E. Darwin, *Zoonomia; or, the Laws of Organic Life*, London 1794-96, vol. I, 1794, pp. 135-184.

<sup>48</sup> H. Brougham, *Dissertations*, cit., vol. I, p. 26.

<sup>49</sup> *Ibid.*, pp. 119-134.

<sup>50</sup> E. Darwin, *Zoonomia*, cit., vol. I, p. 183, italics added.

at work: «I mean where the means are varied, adapted, and adjusted to a varying object, or where the animal acts in artificial circumstances in any way»<sup>51</sup>.

Not surprisingly, such strictly inductive (but one may also say anecdotal) approach led Brougham to criticise the view that regarded intelligence as proportional to the size of the brain<sup>52</sup>. The adoption of such view – which had been contended for by Lamarck and Julien-Joseph Virey – would imply overlooking the numberless instances of intelligence among insects, such as those listed in Kirby and Spence's *Introduction to Entomology*. To Brougham, that criterion should appear entirely arbitrary, based as it was on the unwarranted and aprioristic assumption of a strict correspondence between mental development and organic complexity. The sole reliable criterion was thus the observation of a certain behaviour in relation to circumstances. The parasitic behaviour of the cuckoo, for example, could not be the result of mere instinct, «for there are abundant proofs of her also building when she cannot find a nest, and then she lays in her own, and hatches and rears her brood»<sup>53</sup>; a statement in defence of which Brougham did not hesitate to refer to the great adversary of the theological doctrine of instinct, i.e. Erasmus Darwin<sup>54</sup>.

Yet there was another not too popular opinion which Brougham contended for on similar bases, namely the existence of a mere difference of degree between the intellectual abilities of animals and those of humans. Brougham argued that no animal was devoid of consciousness and of a passive form of memory. In addition, animals could be also credited with both abstraction and comparison. Brougham observed that no human being, no matter how «stupid», was entirely devoid of the power of classifying things, which he considered as an entirely automatic inferential ability: «He can tell a man from a horse. How? By attending to those things in which they differ»<sup>55</sup>. Any person provided with eyes and the faculty of language would be perfectly capable of indicating as “white” both a piece of paper and a spot of snow. Therefore, the question became whether it was reasonable to deny the same ability to animals. In Brougham's opinion this was not the case:

Unquestionably all animals know their mates and their own kind. A dog knows his master, knows that he is not a dog, and that he differs from other men. In these very ordinary operations we see the animal mind at one time passing over certain resemblances and fixing on differences; at another time disregarding differences and fixing only on resemblances. Nay, go lower in the scale. A bull is enraged by a red colour, be the form of the body what you please. A fish is caught by means of a light, be it of any size or any form<sup>56</sup>.

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<sup>51</sup> H. Brougham, *Dissertations*, cit., vol. I, p. 135.

<sup>52</sup> *Ibid.*, pp. 154-167.

<sup>53</sup> *Ibid.*, p. 148.

<sup>54</sup> *Ibid.*, p. 149.

<sup>55</sup> *Ibid.*, p. 193.

<sup>56</sup> *Ibid.*, p. 194.



These were not, as Althorp argued, the result of mere sensation. In the case of a raging bull, for instance, the received sensation included both a certain shape and a certain colour, and yet the animal ignored the first and concentrated on the second, an operation possible solely on the basis of the faculty of abstraction. As if not enough, Brougham argued that animals were able to employ «conventional signs» by means of which they communicated with each other.

How else are we to explain their calls? The cock grouse calls the hen; the male the female of many animals. The pigeon and the fieldfare and the crow make signals; and the wild horse is a clear case of signals. All this implies not only Abstraction, but that very kind of Abstraction which gives us our language. It is in fact a language which they possess, though simple and limited in its range<sup>57</sup>.

Thus, the faculty of abstraction lay at the foundation of animal language, no less than it lay at the foundation of human language, although in the former case it was not combined to an equally developed ability of articulating sounds.

Conclusively, Brougham could argue that the difference between the mind of animals and that of humans was merely of degree. The lesser development of animals was still responsible for the lesser advancements they had made in the course of history: «Clearly this different external conformation, together with their inferior degree of reason, is sufficient to account for brutes having been stationary, and for their being subdued to our use, as the Deity intended they should, when He appointed this difference»<sup>58</sup>. In Brougham's opinion the hypothesis of a difference of degree was thus entirely sufficient to account for the incredibly different results accomplished by animals and humans respectively.

More importantly, Brougham was convinced that both the hypothesis of animal intelligence and that of the difference of degree left completely untouched the theory of design. Not only did he referred to the «station» accorded by the Creator to each species, but he explicitly asserted that any hypothesis concerning animal mind would leave wholly unaltered the inference of design: «The whole question is one of relations and connexions. Adaptation, adjustment, mutual dependence of parts, conformity of arrangement, balance, and compensations, everywhere appear pervading the whole system, and conspicuous in all its parts»<sup>59</sup>. As long as they acknowledged such relations, then, Brougham's hypotheses were thus far from jeopardising the theory of design.

The case of Brougham is thus an indication of the fact that the whole idea of animal intelligence was no longer intolerable to natural theology<sup>60</sup>.

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<sup>57</sup> *Ibid.*, p. 196.

<sup>58</sup> *Ibid.*, pp. 198-199.

<sup>59</sup> *Ibid.*, p. 205.

<sup>60</sup> To be sure, Brougham had not been the first natural theologian to contend for the hypothesis of animal intelligence. See for instance J. Fleming, *The Philosophy of Zoology; or a General View of the Structure, Function, and Classification of Animals*, Edinburgh-London 1822, vol. I, pp. 215-241; W. Kirby and W. Spence, *An Introduction to Entomology: or Elements of the Natural History of Insects*, 5<sup>th</sup> edit., London 1828, vol. II, pp. 460-523; A. Wells, *On Animal Instinct: A Lecture delivered before the members of the Mechanics' Institute, Colchester, on Monday evening, November 25, 1833*, Colchester 1834; J. Macculloch, *Proofs and Illustrations of the Attributes*

While natural theologians had formerly seen in that hypothesis an inadmissible exception to God's supervision of nature, now they were induced to downplay that assumption in response to those philosophies, such as Erasmus Darwin's, which had emphasised the ability of animals of acting intelligently, i.e. of adapting their behaviour according to varying circumstances. Consequently, the idea of unintelligent animals was no longer an inalienable element of the theory of design. In the last section I shall briefly discuss the special role played by Brougham in the development of Charles Darwin's views on instincts, before turning to some general considerations concerning the first developments of evolutionary psychology.

#### 4. The Descent of Evolution

R.J. Richards was the first to notice how Charles Darwin was induced to test natural selection as an explanation of instincts only after reading Brougham's *Dissertations*<sup>61</sup>. Previously he had accepted the "Lamarckian" (so to speak) notion of instinct as "hereditary habit", i.e. the hypothesis that instincts were nothing but habits acquired by individuals and then passed on to their offspring. The reading of Brougham convinced him that for many instincts such explanation did not hold. To give an example, where Brougham described the ability of bees of using, like the finest geometricians, the minimum of wax required to build their cells, Darwin scribbled on his copy of the book: «astonishing on my Th[eory] that infinite attempts should have reach the perfection which mathematics requires – this instinct has same relation to geometry, which the eye has to optics»<sup>62</sup>. As we know, the stance of natural theology – that is, the idea of instinct as concretion of divine intelligence – was based on the impossibility of attributing any complex behaviour to the individual faculties of animals, including intelligence. Yet this was precisely the kind of hypothesis on which Darwin had been working. Now he clearly saw that it was not plausible that the bee had gradually acquired the knowledge required for the construction of the cells. In order not to fall back to the theory of design, he had to look for an alternative explanation; the most obvious he could resort to was natural selection.

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*of God, from the Facts and Laws of the Physical Universe: Being the Foundation of Natural and Revealed Religion*, 3<sup>rd</sup> edit., London 1843, vol. I, pp. 509-554. On Fleming and Macculloch see respectively J. Burns, *John Fleming and the Geological Deluge*, in «British Journal for the History of Science», XL, 2007, pp. 205-225, and G. Hull, *John MacCulloch, MD (1773-1835): A Dedicated Geologist*, in «Journal of Medical Biography», XV, 2007, pp. 235-240.

<sup>61</sup> R.J. Richards, *Instinct and Intelligence in British Natural Theology: Some Contribution to Darwin's Theory of the Evolution of Behavior*, in «Journal of the History of Biology», XIV, 1981, pp. 193-230. See also F. Morganti, *Darwin e l'intelligenza degli animali: dai "Notebooks" al saggio sui vermi*, in *Darwiniana. Evoluzione e comunicazione. Dai vermi all'intelligenza artificiale*, ed. by S. Bucchi and S. Gensini, Pisa 2014, pp. 25-39 (esp. pp. 27-31).

<sup>62</sup> M.A. Di Gregorio (ed. by), *Charles Darwin's Marginalia: Vol. I*, with the assistance of N.W. Gill, New York 1990, p. 93.

What is here interesting to observe is that Darwin was induced to apply the hypothesis of natural selection to the origin of instincts only after getting better acquainted with a traditional argument of natural theology, i.e. the alleged absurdity of the hypothesis that the most astonishing skills of animals rested on their rational faculty. What he did was to turn this argument against the theory of hereditary habits he had previously adhered to. This in turn suggests that between the two conflicting hypotheses he acknowledged the existence of a common ground, namely the assumption of the somehow intelligent nature of instincts.

Yet the influence of natural theology on Darwin was not solely of this negative kind. In early 1839 he had written on one of the folios of his *Notebook N*: «L<sup>r</sup>. Brougham Dissert. on subject connected with Nat. Theology. – says animal have abstraction because they understand signs. – very profound. – concludes that difference of intellect between animals & men only in Kind. – probably very important work»<sup>63</sup>. That Darwin spoke in eulogy of the idea of a difference «only in kind» was evidently due to a *lapsus*, considering that Brougham himself had utterly rejected the thesis of «an essential and specific diversity» between the mind of animals and that of humans<sup>64</sup>. Thus, in Brougham's work Darwin found an important validation of the theses of animal intelligence and of the difference of degree. Other examples of animal intelligence Darwin would find in the works of William Spence, Jonathan Couch, and Edward P. Thompson<sup>65</sup> (among the others).

Yet, it is my contention that what exerted an enormous influence on the early developments of evolutionary psychology was the very assumption that instinct amounted to a form of intelligence. This oriented the theoretical and empirical study of animal faculties, which would now consider the intelligence of instinct as truly belonging to animals rather than being instilled by the deity.

One way of reinterpreting such assumption may be found in Herbert Spencer's *Principles of Psychology* (1855). Spencer conceived life and mind in terms of correspondence between internal and external changes. In Spencer's very definition of life and mind the idea of a fundamental adaptation between organism and environment was implied. The acknowledgment of such correspondence belonged equally to Spencer and natural theologians. What changed was the explanation: it could be asserted, wrote Spencer, either that «there is a pre-established harmony between the inner and outer relations», or that this harmony «arises from the fact, that the outer relations produce the inner relations»<sup>66</sup>. Thenceforth, Spencer would show how intelligence could be decomposed to its ultimate elements, namely the cognitions of likeness and unlikeness between external objects, and then followed in its historical growth,

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<sup>63</sup> P.H. Barrett *et al.* (ed. by), *Charles Darwin's Notebooks, 1836-1844: Geology, Transmutation of Species, Metaphysical Enquiries*, Ithaca 1987, p. 580.

<sup>64</sup> H. Brougham, *Dissertations*, cit., vol. I, p. 199.

<sup>65</sup> Cf. J. Couch, *Illustrations of Instinct, deduced from the habits of British Animals*, London 1847, and E.P. Thompson, *The Passions of Animals*, London 1851.

<sup>66</sup> H. Spencer, *The Principles of Psychology*, London 1855, p. 523.

dependent on a process of mental association. Clearly, then, he maintained the assumption that the laws of nature were somehow framed so as to preserve a fundamental balance between each life-form and its environment. Obviously, rather than ascribing such balance to the deity, he explained it as a result of natural adaptation. Yet he did not get rid of the belief in a beneficial and spontaneous congruence between the inner faculties of creatures and the outer circumstances in which they operated. In Spencer's account, as soon as the circumstances grew in complexity, organisms developed more complex forms of cognition which allowed them to respond properly to those changes. In this perspective, the possibility of a failure in the adaptive process was barely taken into consideration, and the nature itself of the process allowed Spencer to optimistically envision a future of perfect «adjustment» of life to external conditions<sup>67</sup>. While he renounced the deity of natural theology, Spencer preserved the conviction that the course of evolution, and the historical development of mind, exhibited throughout its unfolding the marks of harmonious adaptation and «beneficent necessity».

The other way in which nineteenth-century evolutionary thought naturalized, or rather “mundanised”, intelligence lied in the theory of instinct as “lapsed intelligence”. The expression was coined in the early 1870s by George Lewes, in an article on *Nature* in which he saluted Douglas A. Spalding's recent experiments on young chicks as a validation of the hypothesis advanced in his forthcoming *Problems of Life and Mind*<sup>68</sup>. Here he argued that instinct, while «frequently cited to prove the doctrine of Innate Ideas, may best serve to illustrate the doctrine of evolution». Then he explained:

The marvel and mystery of Instinct naturally render it a favourite topic in the writings of those who oppose the experiential School. Instinct is often regarded as so superior to Intelligence in the certainty of its action, that nothing except Creative Wisdom is admitted in explanation of it; while from other sides it is regarded as so removed from all community with Intelligence, that it is declared to be the blind action of a mechanism, not the operation of a rational Soul. Psychogenesis seems to me to teach the direct contrary of all this. It teaches that Instinct is organised Experience: i.e., *undiscursive* Intelligence [...]<sup>69</sup>.

Three elements from this passage need to be emphasized: first, Lewes's denial that the existence of instincts constituted in itself a refutation of empiricism; second, his belief that to explain the origin of instincts there was no need to invoke the intervention of the deity; and third, his suggestion that between instinct and intelligence there was no clear demarcation, instinct being itself a form of intelligence.

In this article I have provided a sketch of the debate on animal faculties occurred in pre-Darwinian nineteenth-century natural theology. My main concern was to highlight the diversity and richness of the solutions offered to the problem of instinct by natural theologians, as opposed to the historical view

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<sup>67</sup> *Ibid.*, p. 620.

<sup>68</sup> G.H. Lewes, *Instinct*, in «Nature», VII, 1873, pp. 437-438.

<sup>69</sup> G.H. Lewes, *Problems of Life and Mind*, 5 vols., London 1874-98, vol. I, 1874, p. 226.

of natural theology as an unchanging set of beliefs, at least until the appearance of Darwin's *Origin*. The last point I am here making is that the emphasis of evolutionists on the intelligent origin of instincts – i.e. the hypothesis that instincts originated as intelligent actions, which were then rendered automatic by repetition and were finally passed on to the progeny – is accountable for only by reference to the conception of instinct which for a long time was held by most natural theologians. In other words, their insistence on the intelligent character of instincts was due to the natural-theological background that still permeated the culture of their time. The hypothesis of “lapsed intelligence” – which in the following years would be further explored by George J. Romanes<sup>70</sup> – was thus meant to replace the old theory of instinct as divine intelligence. As an indirect validation of this hypothesis, it could be easily shown that in late nineteenth century those who contended for a view of evolution still tinged with natural theology were far from friendly towards the hypothesis of lapsed intelligence, which they saw as an unwarranted attribution to nature of a feature (namely, intelligence) which could only belong to the Creator<sup>71</sup>. However, an in-depth analysis of the late-Victorian debates on animal instincts is necessarily to be postponed to a future occasion.

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<sup>70</sup> Cf. for instance G.J. Romanes, *Mental Evolution in Animals: With a Posthumous Essay on Instinct by Charles Darwin*, London 1883. On Romanes see R.J. Richards, *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior*, Chicago-London 1987, pp. 331-385; J.S. Schwartz, *Out of Darwin's Shadow: George John Romanes's Efforts to Popularize Science in "Nineteenth Century" and Other Victorian Periodicals*, in «Victorian Periodicals Review», XXXV, 2002, pp. 133-159; F. Morganti, *Intelligence as the Plasticity of Instinct: George J. Romanes and Darwin's Earthworms*, in «Theoretical Biology Forum», CIV, 2011, pp. 29-46.

<sup>71</sup> Cf. R.H. Hutton, *Is "Lapsed Intelligence" a Probable Origin for Complex Animal Instincts?*, London 1878; R.H. Hutton, *Instinct and Design*, in «The Spectator», LVIII, 1885, pp. 306-307 (reprinted in Id., *Aspects of Religious and Scientific Thought*, ed. by E.M. Roscoe, London 1899, pp. 120-127); St. G.J. Mivart, *Instinct and Reason*, «Contemporary Review», XXV, 1874, pp. 763-788; St. G.J. Mivart, *Organic Nature's Riddle*, in «Fortnightly Review», XXXVII, 1885, pp. 323-337, 519-531; W.L. Gildea et al., *Symposium: Is There Evidence of Design in Nature?*, in «Proceedings of the Aristotelian Society», I, 1889-90, pp. 49-76. See also Romanes's reply to Mivart: *Professor Mivart on Instinct*, in «Fortnightly Review», XXXVIII, 1885, pp. 90-101.