

BUFFON

e6 Belief in the immutability of organisms

< geologic history as series of stages >

I declare that I die in the religion in which I was born. ... I declare publicly that I believe in it.

—Buffon (as proclaimed by his life-long friend Mme Suzanne Curchod Necker).¹



Georges-Louis Leclerc (1707-1788), Compt de (count of) **Buffon**.² His notion of lost species opened the way for paleontology (Fr. *paléontologie*, term coined by Blainville in 1827).³ He is most commonly cited for his discounted theory that a collision between Sun and a comet spattered out drops of molten material that cooled to the planets. By measuring (as Newton had intimated in *Principia*, 1687) how long incandescent iron balls (**Scholium e6.1**) of diameters from 1 (in half inch increments) to 5 inches, took to cool to black and be safely touchable and then cool to -10°C , he could scale to the size of Earth and pronounce that it took 42,964 years and 221 days to be just livable in the polar regions and to be as today after 86,667 years and 132 days.⁴ These scientifically derived figures, shockingly great at the time, were later understood to be gross underestimates because rock is not a good conductor of heat, as is iron, and ingenious Buffon knew nothing of how radioactivity has slowed Earth's cooling from its originally molten state (which last he had correct, but for a wrong reason).

Buffon's popular writings brought home to the general public the observation that organisms are remarkably well adapted to their existing habitats. His philosophic discussions on nature, the degeneration of animals, the nature of birds, his speculation that Islamic proselytizing failed in China for the people's love of pork, and other topics, he interspersed with the massively detailed catalog of the king's museum that he prepared as the appointed keeper of the Paris *Jardin du Roi*. This beautifully-composed formal garden (*Jardin des Plantes* since the French Revolution, May 1789, when also a year after Buffon's death his son for the accident of his birth was guillotined) was created in 1593 during the reign of Henri IV as a "living encyclopedia" of plants by botanist Pierre Richer de Belleval, with the addition in 1635 during the reign of Louis XIII of a herbarium by physician Guy de la Brosse, to illustrate plants' medicinal properties to students of the University Medical School of Montpellier in the Latin Quarter (the part of Paris where the lingua franca of scholars was Latin).⁵ Publication of Buffon's 44-volume *Histoire naturelle, générale et particulière* was began in 1749.⁶ In it is incorporated much (some said plagiarized) of observation-based insights of Gottfried Wilhelm Leibniz (1646-1716) who invented the differential and integral calculus we use (sorry about that Newton),⁷ and René Descartes⁸ (1596-1650) famous for his assertion: *cogito ergo sum* (I think, therefore I am), and for the Cartesian coordinate system (x, y, z). Buffon's *Epoques de la nature*, 1778, contains the first reconstruction of geological history as a series of stages (seven epochs, six being of prehistorical time): A hot gaseous first during which molten planets formed. The second saw solidification of Earth and mineralized mountains form. Condensation of water vapor flooded Earth in the third and witnessed the appearance of fishes and other creatures of the deep. The while, water flowing to contraction openings in cooling Earth deposited salts and laid down coal. The fourth was a time of volcanic, earthquake, and chaotic sculpting of the land by collapse, tumbling waters, and the deposition of broken pieces (clasts) of older rocks (**Footnote e6.1**). The fifth witnessed the appearance of land animals. These, on the still uncomfortably hot Earth, were at first restricted to the cooler northern climes but, as the world cooled further, equatorward migrations began. Smaller animals spread faster than the ambling large. This accounts for the different populations in South America when in the sixth epoch continents separated and assumed their present outlines. The appearance of mankind has begun a seventh stage (historical time).⁹ Just so.

Either the designs of organisms are original and for specific ecological niches, or the environment throughout the range available to them has molded and changed the organisms that existed. In that the stratigraphic record described by Buffon denies the first possibility, popular misinformation is that the second, which Buffon favored, meant that he held that organisms could change to become new species. But Jacques Roger (1920-1990), in his book *Buffon* (translated into English in 1997), makes clear that Buffon was not a transformist and his arguments for the immutability of the “interior mould” and intersterility through time of species were often cited by 19th century antievolutionists.¹⁰

Claus Wedekind gives this outline:¹¹

Buffon explained variation within a species by what he called the *force pénétrante* and the following model. Organic particles that are transported by the blood system to the different organs are either used for growth and maintenance, or, if they do not spontaneously get assembled into gut worms, get imprinted by these organs under the influence of the *force pénétrante*. They are then collected in seminal fluids. At coition, male and female seminal fluids are mixed and form offspring. These offspring resemble their parents because they are formed by imprinted organic particles. Later, the offspring’s own organic particles will be modified as a result of different habits and environments. Hence—variation in time and space.

After Buffon, prehistory was knowable by this liberating truth: “Nature’s great workman is Time. He marches ever with an even pace, and does nothing by leaps and bounds, but by degrees, gradations and successions he does all things; and the changes which he works—at first imperceptible—become little by little perceptible, and show themselves eventually in results about which there can be no mistake.”¹²

Also, Buffon’s ideas of “lost” species, and Jean Louis Soulavie’s (1752-1813) inference in 1780 from the fossil record of five “ages” for Earth,¹³ prepared the way for Cuvier’s proof (1825) of extinctions that *required* catastrophies (“révolutions du globe”) for manifestly successful animals that could migrate—those that did and found havens survived.¹⁴ □

Footnote e6.1 Excerpt from Chapter III of *Principles of Geology*
by Charles Lyell (1830)¹⁵

Soon after the publication of his ‘Natural History,’ in which was included his ‘Theory of Earth,’ [Buffon] received an official letter (dated January, 1751), from the Sorbonne or Faculty of Theology in Paris, informing him that fourteen propositions in his works ‘were reprehensible and contrary to the creed of the church.’ The first of these obnoxious passages, and the only one relating to geology, was as follows. ‘The waters of the sea have produced the mountains and valleys of the land—the waters of the heavens [rain], reducing all to a level, will at last deliver the whole land over to the sea, and the sea, successively prevailing [flooding] over the land [and then withdrawing], will leave dry new continents like those which we inhabit.’ Buffon was invited by the College in very courteous terms, to send in an explanation, or rather a recantation, of his unorthodox opinions. To this he submitted, and a general assembly of the Faculty having approved of his ‘Declaration,’ he was required to publish it in his next work. The document begins with these words—‘I declare that I had no intention to contradict the text of Scripture; that I believe most firmly all therein related about the creation, both as to order of time and matter of fact; and I abandon everything in my book respecting the formation of the earth, and generally all which may be contrary to the narration of Moses.’ The grand principle which Buffon was called upon to renounce was simply this, ‘that the present mountains and valleys of the earth are due to secondary causes, and that the same causes will in time destroy all the continents, hills and valleys, and reproduce others like them.’ Now, whatever may be the defects of many of his views, it is no longer controverted, that the present continents are of secondary origin.

Scholium e6.1 Excerpt from *The History of the Inquisition*
by Philip van Limborch (translated by Samuel Chandler, 1731)¹⁶

Diogenes Laertius tells us, that *Anaxagoras*, the Philosopher, was accused of Impiety, because he affirmed, that *the Sun was a Globe of red hot Iron*; which was certainly great Herefy, because his Country worshipped him [Sun] as a God.