

## a4 Fossils < casts, molds, petrification, carbonization, tracts, burrows >

I have willingly submitted my plates to the scrutiny of wise men, desiring to learn their verdict, rather than to proclaim my own in this totally new and much mooted question. I address myself to scholars, hoping to be instructed by their most learned response.  
—Beringer, 1726.<sup>3</sup>

It is seldom that the great or the wise suspect that they are despised or cheated.—Alexander Pope.<sup>4</sup>

Fossilization is a process that preserves evidences of prehistoric life. Depending on the life and circumstances, fossilization can be by burial, replacement, distillation, or imprint. A fossil is anything that is itself evidence of prehistoric life. This understanding of what a fossil is and present usage of the word *fossil* was late in coming.<sup>5</sup> The original meaning of “fossil” was *anything unearthed of interesting appearance* (from the past tense of Latin *fodere*, to dig up). The inference that fossils of organic form such as shells in a stratum were once living creatures and have the same age as the stratum was first recorded in passing by Leonardo da Vinci (1452-1519) and later by Girolamo Fracastoro (1478-1553) (**Footnote a4.1**). However, influential Federico Cesi (1585-1630) perpetuated the Aristotelian claim that fossils of organic form were not once living.<sup>6</sup> Nicolaus Steno (1613-1683), in his celebrated *De solido*, 1669, describes remains of once-living plant and animal fossils in sedimentary strata of northern Italy. The fossils, broken or abraded were of constant shape for each type, never deformed as a root that grows in the ground or of different sizes as are crystals.<sup>7</sup> He rejected the common notion of fossils “as of the false starts of Creation.”<sup>8</sup> Robert Hooke (1635-1703)<sup>9</sup> saw organic shaped fossils for what they are, even though the shapes were curious.<sup>10</sup> Indeed, “there have been many other species of Creature in former Ages, of which we can find none at present; and that 'tis not unlikely also but there may be divers new kinds now, which have not been from the beginning.” In *Micrographica*, 1665, he suggested that from such uncounterfeitable forms, better than ancient coins and medals found by archeologists to date ancient debris, a chronology for strata could be established. This insight, offered freely, could not have concerned him that it was not obvious (for to prevent rivals from profiting from his discoveries, and yet safeguard his claim to priority, the paranoia of this “lean, bent and ugly man” was, for example, in 1676 to concealed in the anagram *ceiinosstuv*, which resolves to *ut tensio* [as the extension] *sic vis* [so the force], his *Law of Elasticity: strain is proportional to applied stress*, publish in 1678.<sup>11</sup>

Fossils in themselves are no indication of age. So in 1677 could Robert Plot, the first Keeper of the Ashmolean Museum, Oxford, blithely decide that a giant (dinosaur) bone from within the stone of a local quarry was that of an elephant brought there during the Roman invasion of Britain. Also, opposition to the possibility that fossils were organic found spurious scientific support.<sup>12</sup> For example, Martin Lister (1638?-1712) convinced (correctly) that the deluge theory was impossible, rejected (incorrectly) the animal origin of fossils in strata, which had convinced others. In *Fossil Shells in Several Places of England*, 1671, he argues that fossils are *not* the remains or impressions of once living creatures but are original inorganic components of rock, the minerals and mineral texture of both being the same.<sup>13</sup> Lister popularized conchology (study of shells) by using some English (instead of Latin) in his catalogs *Historiae Conchyliorum*, 1685-92, and *Conchyliorum Bivalvium*, 1696, of recent and fossil shells.<sup>14</sup> In this work, which earned for him the sobriquet “Founder of British Conchology,” he included the first



descriptions of ammonites and belemnites, and the first illustration of a fossil, an extinct gastropod, from the New World (**Figure a4.1**). Despite depicting fossil and recent shells side by side in order to show their remarkable similarity, he continued to deny that seemingly marine fossils found in strata high above sealevel could have once housed marine animals. “Either these were terrigenous, or, if otherwise, the animals they so exactly represent have become extinct.” That organisms had become extinct was not for Lister who would have been deaf to the young-Earth falsity implicit in Linnaeus’s aphorism: “We can count as many species now as were created at the beginning.” For Lister, shells, from single tests to colonial corals, as well as minerals, stalactites, and even gallstones, were *lapides sui generis* (formed stones) grown in situ from mineral solutions. His good friend, **John Ray** (1627-1705),<sup>15</sup> disagreed. In their student days they had traveled together in France observing nature



and collecting. In 1672, Ray suggested an inquiry into the “origin of those stones which we usually call petrified shells.” When in *A description of certain stones figur'd like plants*, published in *Philosophical Transactions*, Lister concluded that some specimens he had examined could *not* have been parts of animals because they were “famous and branched like trees,” Ray demurred that, therefore, they were originally “pieces of vegetables.” The amicable disagreement of the two was not resolved in their lifetime. For Ray, fossil shells were buried remains of once living creatures and, with the virtue of having been correct, Ray is remembered as “England’s greatest naturalist [one who appeals to secondary causes for explanations and not to divine intervention or to final causes] before Darwin.” In 1695, the Welsh naturalist **Edmund Lhwyd** (1660-1709)<sup>16</sup> sent Ray some plant fossils very different from known extant (living) types. Did these supported Lister’s view (now known to be false) that such have grown within rock, the chemistry of which influenced their form? Ray was led to wrestle with the possibility that before the advent of humankind, some now vanished (extinct) life is recorded by fossils:

Yet on ye other side there follows such a train of consequences, as seem to shock the Scripture-History of ye novelty of the World; at least they overthrow the opinion generally received ... that since ye first Creation there have been no species of Animals or Vegetables lost, no new ones produced. But whatever may be said for ye Antiquity of the Earth itself & bodies lodged on it, yet that ye race of mankind is new upon ye earth, & not older than ye Scripture makes it, may I think by many arguments be almost demonstratively proved ...<sup>17</sup>

In the eighteenth century, naturalists as Carolus Linnaeus (1707-1778) and Mendes da Costa (1717-1791) devised classifications for “fossils:” rocks, minerals, and organic remains (“extraneous fossils”) introduced from the vegetable and animal kingdoms. With this world view, in which “fossils” were natural but not necessarily organic, the malicious prank of salting Johann Beringer’s Lügensteine (fossil collecting site) with (to our eyes) ludicrous forms of inorganic runes and fanciful animals could succeed (**Figure a4.2**). Also then, diluvialists, for whom fossils are relict evidences of the Flood, were comfortable in their pity for *Homo diluvii testis* (**Figure a4.3**). □

**Footnote a4.1** Fracastoro is better remembered for naming the (cyclically epidemic)<sup>18</sup> French disease given by Apollo to the shepherd who had angered him, syphilis (in the extended allegory *Syphilis sive Morbus Gallicus*, 1530, written in Latin hexameter), and countermanding the false certainty that Columbus brought it to Europe from the New World).<sup>19</sup> Note however, Bruce M. Rothschild in 1987 found the chemical signature of syphilis in New World bones of an 11,000-year-old bear and since evidence of syphilis in Amerindian skeletons, dating between 500 and 1200 years old, from the Dominican Republic in an area known to have been visited by Columbus and his crew.<sup>20</sup>

**Figure a4.2** (right) Johann Bartholomew Adam Beringer (1670?-1740) at the University of Würzburg, Germany, avidly studied *lapides figurati*, literally “figured stones” (fossils), collected by youths Christian Zänger and Hehm brothers Niklaus and Valentin in his pay from outcrops of (marine) strata in nearby Mount Eivelstadt. A hoax, perpetrated by two of his colleagues, for their dislike of his dismissiveness toward them at the university, was to salt the field with bizarre forgeries; the first found and delivered May 31, 1725, by Zänger. The matter went too far, however, and fearful for their positions, and hopeful of a quiet resolution, the method by which false fossils could be made was revealed to Beringer by hoax perpetrator J. Ignatz Roderick (the other being J. G. von Eckhart). Beringer saw that it could be done, but with a blindness rivaled since only by fictional Lois Lane, he loftily assumed that his paid help had neither a motive nor the wit to deceive him. In 1726, he publish his descriptions and drawings of the fossils in his great work *Lithographiae Wirceburgensis* (and then tried to buy all back when he did learn the truth).<sup>21</sup>



**Figure a4.3** *Homo diluvii testis*, offered in 1725 as “the bony skeleton of one of those infamous men whose sins brought upon the world the dire misfortune of the deluge” by Johann Jakob Scheuchzer (1672-1733), is actually (Cuvier would show)<sup>22</sup> the skeleton of an Upper Miocene giant salamander.<sup>23</sup> Scheuchzer is more laudably the founder of paleobotany for his *Herbarium Diluvianum*, 1709.<sup>24</sup>