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TWO HUNDRED YEARS OF PALAEOLOGY: HENRI MARIE DUCROTAY DE BLAINVILLE AND THE SCIENCE OF ANCIENT BEINGS

*Doscientos años de Paleontología: Henri Marie Ducrotay de Blainville
y la ciencia de los seres antiguos*

Eric Buffetaut

CNRS (UMR 8538), Laboratoire de Géologie de l'Ecole Normale Supérieure, PSL Research
University, 24 rue Lhomond, 75231 Paris Cedex 05, France
Palaeontological Research and Education Centre, Maha Sarakham University, Maha
Sarakham 44150, Thailand

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Abstract. The word "palaeontologie" was coined in 1822 by the French anatomist and zoologist Henri Marie Ducrotay de Blainville (1777-1850), a former disciple of Georges Cuvier who had turned against his mentor and rejected catastrophism. Blainville's life and scientific career are briefly reviewed. The meaning and significance of the new word "palaeontology", as compared with older designations such as "oryctology" are discussed, as well as Blainville's creationist interpretation of the fossil record and his relations with the geologist Constant Prévost.

Keywords. Palaeontology, Ducrotay de Blainville, France, Creationism, Etymology

Resumen. La palabra "paleontología" fue acuñada por el anatomista y zoólogo Frances Henri Marie Ducrotay de Blainville (1777-1850), un antiguo discípulo de Georges Cuvier que se había vuelto contra su mentor y rechazó el catastrofismo. Se revisa brevemente la vida y la carrera científica de Blainville. Se discute el significado y la importancia de la nueva palabra "paleontología", en comparación con designaciones más antiguas como "orictología", así como la interpretación creacionista de Blainville del registro fósil y sus relaciones con el geólogo Constant Prévost.

Palabras clave. Paleontología, Ducrotay de Blainville, Francia, Creacionismo, Etimología

INTRODUCTION

It is no easy task to pinpoint the date of origin of a scientific discipline, and palaeontology is no exception, although it can safely be said that it emerged as a science based on sound principles during the last decade of the eighteenth century. The names of researchers such as Georges Cuvier (1769-1832), who on the basis of comparative anatomy demonstrated that innumerable species had become extinct in the course of geological time, or William Smith (1769-1839), who showed how the distribution of fossils in rocks could be used for stratigraphic purposes, come to mind. However, neither Cuvier nor Smith used the word “palaeontology” to describe the science they were practising. The word “palaeontology” (as ‘palaeontologie’) was coined in 1822 by the French anatomist and zoologist Henri Marie Ducrotay de Blainville (1777-1850). On the occasion of the bicentenary of this word, which, after a slow start, eventually became widely accepted and now forms part of many languages, it seems appropriate to discuss at some length the life and scientific career of Blainville, as well as the significance of the introduction of the word ‘palaeontology’.

A SHORT BIOGRAPHY OF HENRI MARIE DUCROTAY DE BLAINVILLE

The following biographical sketch is based on a speech given at Blainville’s funeral in 1850 by his friend the geologist Constant Prévost, who mentioned various episodes told by Blainville himself (Prévost, 1850), and on the biography published by Nicard (1864). In an obituary for the French Academy of Sciences, Flourens (1854, 1856) gave a somewhat different version

of Blainville’s life, which was criticized by Nicard.

Henri Marie Ducrotay de Blainville (Fig. 1) was born on 12 September, 1777 in Arques (today Arques-la-Bataille), a small town in Normandy, close to the port city of Dieppe, today in the *département* of Seine-Maritime (the *départements* are administrative subdivisions erected in 1790 by the French Revolution, after Blainville’s birth). His native house, which since 1927 bears a memorial plaque, still stands in the centre of the town (fig. 2). He was the son of Pierre Ducrotay de Blainville (1714-1782) and Marie Suzanne Pauger (1744-1804). His family belonged to the local gentry, and as a youngest son (his elder brother Pierre had been born in 1770) he was supposed to embrace a military career. He was therefore duly sent to the Military Academy at Beaumont-en-Auge, in a different part of Normandy near the port city of Honfleur. In 1792, as the French Revolution was taking an increasingly violent turn, he left the academy and took refuge on a foreign (presumably British) ship cruising in the English Channel, taking part in several naval actions — this is at least what he told Prévost, although Nicard found the story somewhat obscure and noted various discrepancies—. In 1796 he was in Rouen, where he studied draughtsmanship for some time. He then moved to Paris, where he studied painting for a time in Jacques-Louis David’s studio, as well as music and acting. During these early years in Paris, he seems to have led a rather disorderly life, according to various testimonies.

When he was about 27 (according to Prévost, 1850), he attended a lecture by Georges Cuvier at the Collège de France which so impressed him that he decided he would devote himself to the natural sciences. In 1810, he obtained a doctorate in medicine (this was the usual way of starting a career in natural history at that time).

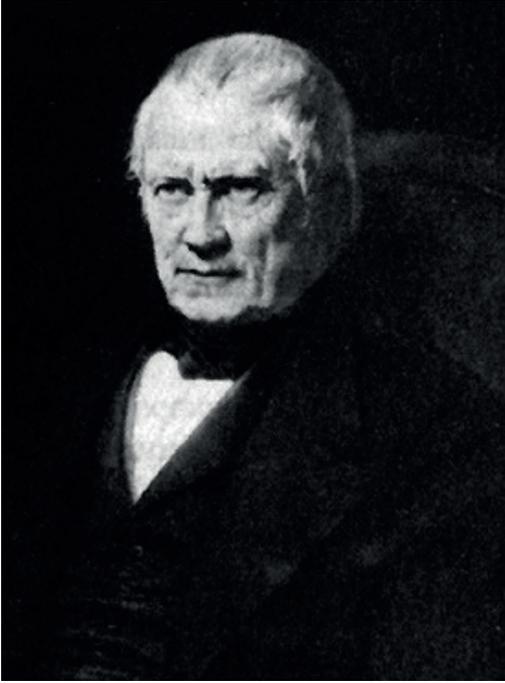


Figure 1 - Portrait of Henri Marie Ducrotay de Blainville (1777-1850).

For some time, he was Cuvier's assistant at the Collège de France, and in 1812, he became professor of zoology, anatomy, and physiology at the Sorbonne. At first, he enjoyed Cuvier's support and patronage, but their relation gradually deteriorated. A break ensued, the reasons of which are discussed below.

In 1825, Blainville became a member of the French Academy of Sciences. In 1830, after Lamarck's death in 1829, he obtained the chair of natural history of molluscs, worms, and zoophytes at the Paris Muséum national d'histoire naturelle. When Cuvier died in 1832, he succeeded him as professor of comparative anatomy in the same institution, a position he held until his death.

Blainville died of a stroke on 1st May, 1850 at a Paris railway station while boarding a train bound for his native Normandy.

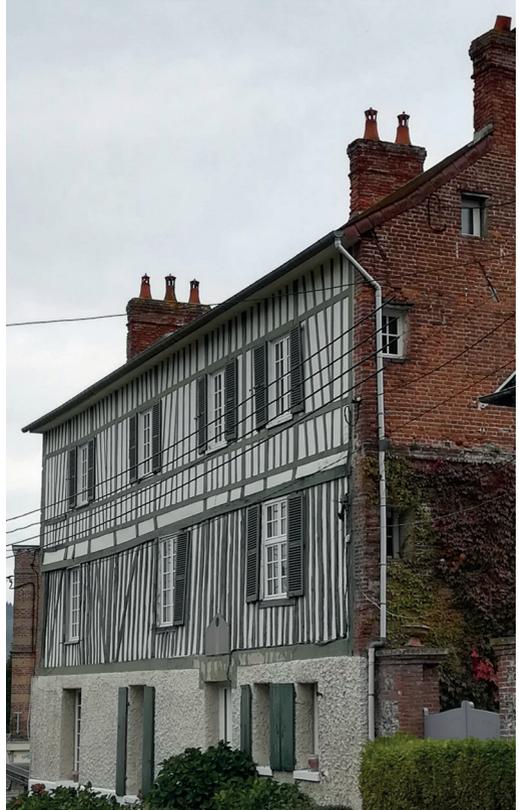


Figure 2 - Blainville's native house in Arques-la-Bataille (Seine-Maritime, Normandy, France), a typical half-timbered Norman house (photo H. Tong).

BLAINVILLE'S SCIENTIFIC WORK AND PERSONALITY

A comprehensive review of Blainville's multifarious research activities is beyond the scope of this paper and can be found in the biographical essays by Flourens (1854) and Nicard (1864). Only some of his main publications will be mentioned here. His anatomical and zoological researches covered a wide range of topics, as shown by the lists of his publications compiled by Flourens (1854, 1856) and Nicard (1864). He published a large number of papers on the anatomy and classification of molluscs,

as well as a handbook of malacology and conchylology (Blainville, 1825). This was followed in 1834 by a manual of actinology or zoophytology, dealing with jellyfish, echinoderms, and corals (Blainville, 1834). His interest in molluscs extended to fossils: he published an extensive memoir on belemnites, considered from the zoological and geological points of view (Blainville, 1827). His work on these groups explains why he was chosen to succeed Lamarck at the Muséum national d'histoire naturelle in 1830.

However, Blainville also was a leading expert on vertebrates, on which he published extensively. Although he was

mainly interested in mammals, he also worked on fishes, reptiles and birds (including the dodo, *Raphus cucullatus* (Fig. 3), which he mistakenly considered as a kind of flightless vulture; Blainville, 1835). Blainville's researches on mammals included both extant and extinct forms. Among his major contributions was the subdivision of mammals into three major groups (Blainville, 1839a), based on the reproductive organs: the "monodelphes" (placentals), "didelphes" (marsupials) and "ornithodelphes" (monotremes) – although the names he proposed are no longer used, his classification basically is still in use. His palaeontological publications cover a wide



Figure 3 - Reconstruction of the head of the dodo (*Raphus cucullatus*), from Blainville's *Mémoire sur le Dodo, autrement Dronte* (1835, plate 1).

range of fossils, with special emphasis on Tertiary mammals. Retrospectively, he was less successful when dealing with Mesozoic specimens, for instance when he interpreted the Triassic tetrapod footprints from Hildburghausen in Germany, named *Chirotherium* by Kaup, as plant impressions (Blainville, 1836).

His *magnum opus* was to be his *Ostéographie ou description iconographique comparée du squelette et du système dentaire des cinq classes d'animaux vertébrés récents et fossiles pour servir de base à la zoologie et à la géologie*. This was a huge project, which was started in April 1839 when Blainville published a "prospectus" outlining what this great work would be. The aim was to publish a total of 500 to 600 in-4° lithographic plates by Jean-Charles Werner

(1798-1856), a gifted artist working for the Muséum national d'histoire naturelle, illustrating the skeletons and teeth of living and fossil vertebrates, on the basis of the large collections of that museum (Fig. 4). The plates would be accompanied by detailed descriptions by Blainville. Apparently one of the unavowed intentions of the author was to supersede Cuvier's *Recherches sur les ossements fossiles* (the last volume of the fourth, posthumous, edition was published in 1836), in which various groups of vertebrates had been more or less neglected. According to its subtitle, the aim of the *Ostéographie* was to "serve as a basis for zoology and geology". In the first sentence of his prospectus, Blainville (1839b) complained about the serious mistakes made by geologists

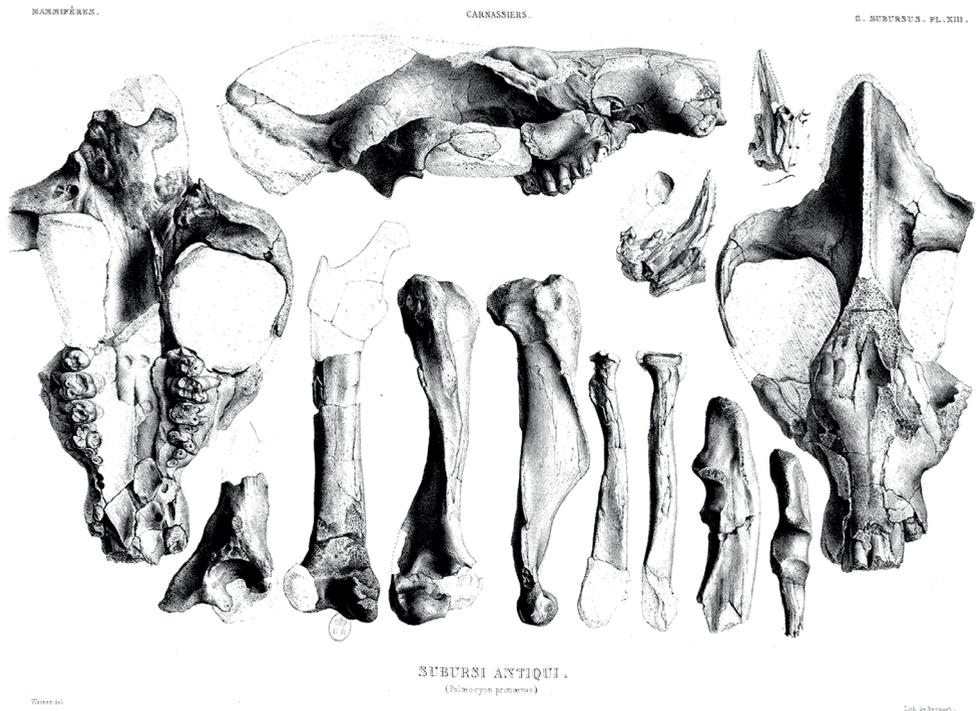


Figura 4 - An example of Jean-Charles Werner's lithographic plates for Blainville's *Ostéographie*: fossil remains of the Paleocene mammal *Arctocyon* (here called *Palaeocyon*), after Blainville (1839-1864).

because of inadequate and misconceived presentations of the facts of palaeontology. One of the main goals in starting his huge project clearly was to remedy this unfortunate situation by providing means to identify fossil vertebrates on the basis of exact anatomical plates and descriptions depicting the skeletal and dental elements of living and extinct forms. Publication was to be by fascicles, on a subscription basis, by the well-known scientific publisher Arthus Bertrand, and later by J.B. Baillière. Subscribers were not numerous enough and eventually only 24 fascicles were published in Blainville's lifetime (Nicard, 1864; Sherborn, 1898), between 1839 and 1850, all dealing with mammals (Sherborn, 1898). This failure left Blainville embittered.

Blainville was also interested in the history of science, albeit with special motivations. In 1845, he published *L'histoire des sciences de l'organisation et de leurs progrès comme base de la philosophie*, with the abbé François-Louis-Michel Maupied as co-author. This book was to some extent a reply to Cuvier's *Histoire des sciences naturelles depuis les origines jusqu'à nos jours chez tous les peuples connus*, the last (posthumous) volume of which also appeared in 1845 (Cuvier and Magdeleine de Saint-Agy, 1845). Blainville was a devout Roman Catholic with strongly dogmatic convictions, and this was reflected in his conception of the history of science. He considered that the aim of science was to know God through His works, and that philosophy and Christian religion could not be separated. Maupied shared these views and held even more extreme positions; he rewrote parts of Blainville's manuscript to denounce in even stronger terms the philosophical views of the Enlightenment. Blainville and Maupied's philosophical and theological positions have been analysed by Canguilhem (1979) and need not be discussed at greater length here. However,

it should be noted that Blainville's strong religious convictions help to explain many of his conceptions about the history of life.

Blainville's personality is also worth discussing briefly. Many contemporaries described him as a difficult person, although opinions of course varied. His friend the geologist Constant Prévost, not unexpectedly, was less critical than some others who criticised his misanthropy, contrariness, and pride (sometimes considered as a mark of a "feudal" spirit inherited from his aristocratic ancestors). Flourens (1854, 1856) quoted Cuvier as joking that whatever question you asked Blainville, and even when saying "Good day" to him, he would always answer "No". In their satirical little book on the "natural history" of the professors of the Jardin des Plantes (the Paris Natural History Museum), published in 1845, the journalist and later civil administrator Isidore de Gosse and the botanist (and early evolutionist) Frédéric Gérard poked fun at Blainville, dubbing him *Anatomicus erinaceus* (the latter word is Latin for hedgehog) and describing him as "ill-tempered even when happy", misanthropic and "the enemy of the whole universe". He was supposedly living alone with a parrot, a dog, and a housekeeper, "who try in vain to emulate their master" (Gosse and Gérard, 1845). Even the Jesuit Antonin Eymieu, who did his utmost to show that all important scientists (including Charles Darwin) had been good Christians, found that, despite his strong religious beliefs, Blainville's personality did not make him an ideal scientist – he was too fond of contradicting others, too keen to make a name for himself, too domineering (Eymieu, 1920). Others were less critical: Pizzetta (1891) described him as hard-working, with an ardent imagination and a lively and sharp mind. The break with his former mentor Cuvier has been widely interpreted as a consequence of his independent and

haughty spirit – he could not accept what he felt was a humiliating subordinate position. Beyond that, however, his scientific disagreements with Cuvier were deep and not only based on personal rivalry (see below).

Despite the above-mentioned harsh judgments about his personality, Blainville's memory was honoured by posterity. His name is inscribed on the front of the zoology building (today "Grande galerie de l'évolution") of the Muséum national d'histoire naturelle in the Jardin des Plantes, together with those of other eminent zoologists.

COINING THE WORD "PALAEOLOGY"

The word "palaeontology" first appears in volume 94 of the *Journal de Physique, de Chimie, d'Histoire naturelle et des Arts*, in January 1822. The *Journal* had begun publication in 1771 (as *Observations sur la Physique, sur l'Histoire naturelle et sur les Arts*), had barely survived the French Revolution, and stopped being published in 1823. Its editor had long been the geologist Jean-Claude Delamétherie (1743-1817) who was seconded in this task by Blainville from 1813 to 1817. After Delamétherie's death, Blainville succeeded him as sole editor in 1818. In the January 1822 issue, the word

"palaeontology" is used only once in a long "preliminary discourse" by Blainville (1822), which is a review of the main papers on the "physical sciences" (including physics, astronomy, meteorology, chemistry, and natural history) published in 1821. It appears under the section on geology, on page liv (Fig. 5), to introduce a short chapter in which a few publications on fossils are mentioned, including the second edition of Cuvier's *Recherches sur les ossements fossiles*, Soemmering's description of a large saurian from Bavaria, a brief discussion of *Ichthyosaurus*, discoveries of human remains and rattlesnake bones in caves, and a coal formation in North America. Surprisingly enough, considering that it was the first use of a new word, no definition of "palaeontology" is provided. The etymological meaning of the word, from the Greek roots *palaios* (ancient), *ontos* (genitive of *on*, being) and *logos* (discourse), may have been relatively obvious to readers familiar with the ancient Greek language, as most of the naturalists of the time were, but it still seems slightly surprising that Blainville did not bother to provide an explanation. He merely noted that quite a few papers in this branch of natural history had recently been published, as a consequence of a considerable interest in geology, and specifically mentioned the use of "fossil organised bodies" for the distinction of sedimentary formations. It was only in 1825, in his *Manuel de Malacologie et de*

Palæontologie. La grande prépondérance que l'étude de la Géologie continue d'avoir parmi les sciences naturelles, et celle qu'une sorte d'école en Géologie accorde, l'emploi des corps organisés fossiles pour la distinction des formations de sédiment, ont déterminé un assez grand nombre de travaux dans cette branche d'histoire naturelle.

Figura 5 - Extract from Blainville's 1822 paper where the word 'palaeontology' first appears (Blainville, 1822, p. liv).

Conchyliologie, that Blainville, in a footnote, provided a brief definition (still without giving an etymology) of what he meant by "palaéontologie", viz. the science which deals with the study of fossil organised bodies: "*Il me semble utile de créer un mot composé pour la science qui s'occupe de l'étude des corps organisés fossiles*" (Blainville, 1825, p. 225). As pointed out by Léna (2013), it took some time before the word gained currency. By the 1840s, however, it was commonly used by French-speaking scientists, such as d'Orbigny (1842, 1849), Pictet (1844), Serres (1846) or Gervais (1848-1852), and it then became part of other European languages, with minor spelling changes (see Podgorny, 2021, for more details).

It is worth mentioning that, as noted by Léna (2013), as early as 1818, Blainville had used the word "paléozoologie" in the "conchyliologie" entry of Frédéric Cuvier's *Dictionnaire des Sciences naturelles* (Blainville, 1818, p. 213). Although "palaéozoologie" is still sometimes used, another word coined by Blainville – "an inspired creator of neologisms, most of which died with their creator", to use Podgorny's pleasant expression (Podgorny, 2021, p. 7) – never gained currency: in one of his reviews for the *Journal de Physique* in 1820, he used the word "palaéosomiologie" to denote the study of fossil organised bodies found buried at various depths in the secondary strata of the earth, a growing discipline of great usefulness to geognosy (Blainville, 1820, p.80). The word "somiologie" had been coined by the naturalist Constantin Samuel Rafinesque-Schmaltz (1814) for the "science of living bodies". Blainville himself did not use "palaéosomiologie" for a long time, since as early as 1822 he had chosen "palaéontologie" instead.

What exactly Blainville meant by "palaéontologie" is worth discussing at some length, although it is a somewhat difficult task since he did not give a very detailed

definition. A point worth considering is the emphasis on "organised bodies", a term much used in the early nineteenth century to designate living organisms. In this connection, it should be remembered that in Blainville's days, there already was a word, "oryctology" (or "oryctography"), based on the Greek word *oryctos* (dug up from the ground), for the science of fossils (see Podgorny, 2021 for a discussion of its use in various countries). By the early nineteenth century, it had come to mean the study of fossils in the present meaning of the word, viz. remains of ancient living beings; this is, for instance, what James Parkinson meant when he published his *Outlines of Oryctology* in 1822. However, the word had been in use since at least the beginning of the eighteenth century and at that time it had a much wider meaning since "oryctology" dealt with all sorts of objects extracted from the earth's crust, including fossils in the modern sense of the word but also minerals and all kinds of "stones". This is apparent, for instance, from Johann Jakob Baier's *Oryctographia Norica* (1708) or Antoine Dezallier d'Argenville's *Oryctologie* (1755). In his *Dictionnaire universel des fossiles propres et des fossiles accidentels*, which he described as a *Dictionnaire universel oryctologique*, Bertrand (1763) included sands, earths, stones, salts, sulphurs, bitumens, minerals and metals, as well as "petrifications of animals and plants", i.e., fossils in the modern sense of the word.

Blainville's "palaéontologie" that etymologically translates as "discourse on ancient beings" had a subtly different meaning: unlike "oryctology", which, even when restricted to organic remains, dealt with the description of fossils as objects dug up from the earth, "palaéontologie" went a step further and focussed on living beings from the (distant) past. Fossils of course were the objects on which this discourse

had to be based, but the aim of the newly named science was not just to describe them but to interpret them in order to reconstruct the organic world of the past – an approach Cuvier had pioneered without using a specific word to name it. As noted by Rudwick (2008, p. 48), "Blainville's new word reflected the growing value of fossils in their own right". Although Blainville was interested in the stratigraphic distribution of fossils (as shown, for instance, by his memoir on belemnites), and was well aware of their usefulness for geology as a means of distinguishing different strata, he was not a geologist, but an anatomist and zoologist. The anatomy of fossils could be compared with that of modern animals or plants, and this in turn enabled to place them in zoological or botanical classifications. As implied by the ill-fated word "palaeosomiology", the science of fossils was a biology of ancient beings. From this point of view, the scientific discipline to which Blainville gave a name essentially was what palaeontology is today.

BLAINVILLE'S VIEWS ON PALAEOLOGY AND THE FOSSIL RECORD

The way Blainville interpreted the results of palaeontology is another matter. Many authors have emphasized that his approach was different from that of Cuvier, but their personal antagonism does not fully explain the difference. Pizzetta (1891) put forward a religious explanation: according to him, Blainville, as a "sincere and convinced" Roman Catholic, could only oppose Cuvier's Protestant principles. This is probably an oversimplification, since, according to various evidence (Outram 1986, Buffetaut, 2002), Cuvier's religious convictions were not as strong as has often been claimed. Be that as it may, Blainville's

view of the history of life differed markedly from Cuvier's catastrophism, in which whole faunas had been destroyed by "revolutions of the globe". Unlike later catastrophists, such as d'Orbigny, Cuvier did not think that these revolutions had caused complete annihilations of all living beings, thus removing the need for multiple creations (see, e.g., Buffetaut, 2002). Still, Blainville opposed catastrophism, for reasons that have been investigated by historians of science, notably Gohau (1979) and Appel (1980). While catastrophists, whether they accepted multiple creations or not, envisioned a succession of species through geological time, Blainville, at least in the later part of his scientific career, rejected this view of the history of life as revealed by the fossil record. As noted by Gohau (1979), he seems to have changed his mind about this point. In the 1820s, at the time he coined the word "palaeontology", he emphasized the usefulness of fossils for geology, as they provided a means of distinguishing different sedimentary formations. This seems to imply a belief in a succession of distinct faunas and floras, as accepted by catastrophists (and also by early evolutionists, albeit they interpreted this succession in a very different way). Blainville later came to a different conception of the living world and its history, which, as noted by Appel (1980), was an updated version of the Great Chain of Being of earlier authors. To him, there existed a continuous "animal series" which reflected the unity of creation: all living beings were the product of a single and simultaneous act of creation. Subsequently, some species had become extinct, for instance, because of predation, including by humans (the dodo was a case in point, although Blainville suspected that it may still be alive in Madagascar). Fossil species which had no living equivalents filled in apparent gaps in the animal series. This interpretation rejected the idea of

multiple creations in the wake of global catastrophes, as supported, notably, by d'Orbigny (1851), and supposedly was in better agreement with Christian orthodoxy. It was more difficult to reconcile it with the growing body of evidence concerning earth history and the fossil record provided by the developing science of geology, which certainly suggested significant faunal and floral changes in the course of geological time. However, Blainville could find some support in the theories of his friend Constant Prévost (1787-1856). Prévost (Fig. 6) is frequently hailed in France as an early promoter of actualism (or uniformitarianism), a sort of French version of Charles Lyell; although his views were rather distinct from those of his Scottish counterpart. He did reject catastrophism, but this rejection led him to a rather peculiar view of earth history. By emphasizing continuity and uniformity, he was led to believe that formations usually considered as successive in time were in fact contemporaneous, being lateral facies variations, and to consider that environmental conditions had not changed significantly over geological time (see Gohau, 1978, 1987, for a more detailed discussion of Prévost's conceptions). Although Prévost mildly criticised Blainville for making science subordinate to religion, their views had much in common, despite differences on some points. As Prévost did for geological history, Blainville emphasized the continuity of the living world. However, as noted above, he interpreted the "animal series" as the result of a single act of creation, whereas Prévost favoured the idea of continuous creation through time. Both underplayed the role of extinction, considering that many fossil species were in fact identical to living ones (Blainville even thought that the mammoth possibly was conspecific with the living Asian elephant). Blainville occasionally resorted to the hypothesis Lamarck had used to deny the



Figura 6 - Portrait of Constant Prévost (1787-1856), geologist, promoter of actualism and Blainville's friend.

reality of extinction, viz. that supposedly extinct species may in fact survive in unexplored parts of the globe (he did so with the dodo: Blainville, 1835).

At the end of his scientific career, as he was trying in vain to complete publication of his *Ostéographie*, Blainville had come to accept a view of the history of life which he thought was in accordance with his Christian faith. To him, like all scientific disciplines, the study of fossils, to which he had given a name, was a way of discovering God's will and actions in His creation. His views found few adherents (about them, see Appel, 1980), and the rather rapid rise of evolutionary palaeontology after the publication of Darwin's *Origin of species* in 1859, with its emphasis on change through time, soon consigned them to oblivion.

CONCLUSION

After a rather slow start, by the mid-19th century the word "palaeontology"

had become part, under various guises, of most European languages. From that point of view, Blainville's "invention" was an undeniable success. Outside the scientific community, and despite frequent confusions (especially with archaeology) as to its meaning, "palaeontology" has long been a popular word, as a name for a discipline which attracts considerable public attention, a popularity which may be seen as another proof of the word's success. What may sound paradoxical, though, is that a science that today is so firmly associated with the evolution of life owes its name to a fervent creationist.

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