

Buffon and Daubenton: Divergent Traditions within the *Histoire naturelle*

By Paul Lawrence Farber*

WITH THE EXCEPTION of two translations and a few articles, the thirty-six volumes of the *Histoire naturelle, générale et particulière* comprise Buffon's *oeuvres complètes*.¹ They also stand as one of the great intellectual monuments of the French Enlightenment. Considering that they were written by one of the noted stylists of the century, were illustrated with hundreds of engravings, were sumptuously printed by the Imprimerie Royale, and constituted the largest undertaking of its kind since the days of Pliny, it is hardly surprising that the *Histoire naturelle* swiftly became the most widely read work on natural history in France² and was the third most popular piece of literature there during the latter part of the eighteenth century.³

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¹Georges-Louis Leclerc de Buffon, *Histoire naturelle, générale et particulière* (Paris: Imprimerie Royale, 1749-1789).

²Buffon's popularity, of course, was not confined exclusively to his French audience. George Bernard Shaw's opening sentences of the introduction to his play *Back to Methuselah* illustrate this point rather well:

One day early in the eighteen hundred and sixties, I, being then a small boy, was with my nurse, buying something in the shop of a petty newsagent, bookseller, and stationer in Camden Street, Dublin, when there entered an elderly man, weighty and solemn, who advanced to the counter, and said pompously, "Have you the works of the celebrated Buffon?"

My own works were at that time unwritten, or it is possible that the shop assistant might have misunderstood me so far as to produce a copy of Man and Superman. At it was, she knew quite well what he wanted. . . . The celebrated Buffon was not a humorist, but the famous naturalist Buffon. Every literate child at that time knew Buffon's Natural History as well as Esop's Fables.

Bernard Shaw, *Back to Methuselah* (London: Constable, 1936), p. vii.

For a list of the dozens of French editions as well as the numerous translations of Buffon's writings see the excellent "Bibliographie de Buffon" prepared by Mme E. Genet-Varcin and Jacques Roger in Jean Piveteau, ed., *Oeuvres philosophiques de Buffon* (Paris: Presses Universitaires de France, 1954), pp. 513-575. Where possible I have quoted from Piveteau's work, the most readily available source for consultation, which will here after be referred to as *O.P.* All other references are to the first edition unless otherwise noted.

³Daniel Mornet, "Les enseignements des bibliothèques privées (1750-1780)," *Revue d'Histoire Littéraire de la France*, 1910, 18:460.

Everyone did not profit from Buffon's success. Because the *Histoire naturelle* has become identified as Buffon's collected works, the recognition of contributions—often substantial—made by his collaborators has become obscured with time. Few people remember, for example, that the *Histoire naturelle's* prospectus published in the *Journal des Sçavans* outlines a fifteen-volume work to be written, “partly by M. Buffon and partly by M. Daubenton, each one equally valuable to the Republic of Letters and each one a member of the most illustrious Academies in Europe.”⁴

Louis-Jean-Marie Daubenton (1716–1800) was the first and most famous of Buffon's collaborators.⁵ Trained as a physician at Reims he had just returned to Montbard—his, as well as Buffon's, native home—to practice medicine when he was requested by Buffon to join him at the Jardin du Roi. The opportunity to work at the royal institution must have been very exciting, and Daubenton joined Buffon there in 1742. In 1745 he was appointed *Garde et Démonstrateur* of the Cabinet du Roi.

Buffon at this time was planning his natural history. He believed that what was needed in his day was a complete history of each animal, as opposed to the classifications and catalogues that existed. Presumably a description would not be complete without a careful morphological study, and since he lacked skill and training in anatomy, he sought the aid of someone who could supply him with the anatomical data he required. Buffon was lucky; he had the good fortune to pick a collaborator who turned out to be one of the great anatomists of the second half of the eighteenth century. Daubenton supplied painstakingly exact descriptions to supplement each of Buffon's articles on the quadrupeds. Actually, “supplement” is a misleading word, since Daubenton's articles are occasionally twice as long as the preceding article by Buffon and often have as many as nine auxiliary illustrations.⁶ In addition to his anatomical work Daubenton also wrote brief descriptions of the relevant holdings of the Cabinet du Roi, and these were inserted after each of his articles.

Not much is known about the relations between Buffon and Daubenton.⁷ They collaborated on the first fifteen volumes of the *Histoire naturelle* (i.e., the quadrupeds), after which Daubenton ceased work on the project, and

⁴*Journal des Sçavans*, Amsterdam, Apr. 1749, 147:549.

⁵For Daubenton's life see Georges Cuvier, “Éloge historique de Daubenton,” in his *Recueil des éloges historiques lus dans les seances publique de L'Institut Royal de France* (Strasbourg: F. G. Levrault, 1818), Vol. I, pp. 37–80, and Louis Roule, *Daubenton et l'exploitation de la nature* (Paris: Flammarion, 1925). There exists no complete study of Daubenton's work.

Buffon's collaborators are discussed in Pierre Flourens, *Des manuscrits de Buffon* (Paris: Garnier Frères, 1860), and in M. Humbert-Bazile, *Buffon sa famille, ses collaborateurs et ses familiers. Mémoires par M. Humbert-Bazile son secrétaire mis en ordre, annotés et augmentés de documents inédits par M. Henri Nadault de Buffon son arrière-petit-neveu avec cinq portraits a crier* (Paris: Renouard, 1863).

⁶These anatomical articles have very correctly been considered as the progenitors of the work done by Félix Vicq d'Azyr (1743–1794) and Georges Cuvier (1769–1832). See William Coleman, *Georges Cuvier: Zoologist* (Cambridge, Mass: Harvard University Press, 1964), p. 61. It is a great shame that no one to date has made Daubenton's anatomical work the subject of extensive investigation.

⁷Their letters to one another, for instance, have been lost. J.-L. de Lanessan, ed., *Oeuvres complètes de Buffon* (Paris: A. Le Vasseur, 1885), Vol. XIII, p. 53.

the anatomical descriptions were dropped from the format of the *Histoire naturelle*. Pierre Flourens wrote that upon completion of the quadrupeds Buffon authorized the publisher Charles-Joseph Panckoucke (1736–1798) to print another edition omitting the anatomical articles,⁸ and that Daubenton was greatly insulted by this action. It is possible that he was so offended by this slight that he withdrew from the enterprise. However, Cuvier in his “Éloge historique de Daubenton” suggested that Buffon had been misled into believing that Daubenton’s articles made the *Histoire naturelle* somewhat dull, and that Buffon decided to publish his later works without them.⁹ If either of these two explanations is correct, it is ironic. For Buffon owed much of his lasting scientific fame to these anatomical observations, whereas Daubenton owed much of his obscurity to having worked with such a famous stylist.

The extant alternatives—Daubenton’s vanity or Buffon’s vanity—make for a colorful story. But there exists little evidence supporting either one, and it is probable that we shall never know with certainty the exact reasons for the termination of what historically appears such a fruitful collaboration. This does not mean that the matter is one beyond the realm of inquiry. We can, using what material there is, offer highly plausible reasons why Buffon and Daubenton went their separate ways. Moreover, this sort of study will reveal a more profound issue than the politics of publishing. A careful comparison of Buffon’s and Daubenton’s work in the 1760s discloses a tension between their philosophic positions concerning natural history: Buffon’s orientation was fundamentally historical whereas Daubenton’s was essentially morphological. An inquiry into the origin and significance of this tension may provide not only an explanation of why these two men ceased their collaboration but also an insight into one of the major problems of Enlightenment natural history. To appreciate the ultimate degree of difference between Buffon and Daubenton, it will be necessary to examine the development of each man’s view of natural history.

CONCEPTS OF NATURAL HISTORY: INTRODUCTORY STATEMENTS

The introductory volumes of the *Histoire naturelle* contain articles on natural history that reflect the different viewpoints of their authors. Buffon’s basic position is stated in his “Premier discours; De la manière d’étudier et de traiter l’Histoire naturelle.”¹⁰ In this introductory essay he skillfully argues that natural history should include careful description and a life history for each animal. However, the end goal for the naturalist is not a catalogue or classification of characteristics, particularly not of minute anatomical characteristics; rather, it is the depiction of the history of the living world and the discovery of general effects in nature. Steering a course between system building on the one hand and radical empiricism on the other, Buffon consciously placed himself

⁸Flourens, *Des manuscrits*, p. 187.

⁹Cuvier, “Éloge,” pp. 57–58.

¹⁰*O.P.*, pp. 7–26.

in the tradition of the great naturalists of antiquity, Aristotle and Pliny, who he felt studied the particulars of nature in order to discover its underlying laws. To accomplish such a lofty aim the naturalist must consider more than just the individual: he must study groups of animals and investigate inter- as well as intraspecific relationships. Moreover, he must do this for all animals, not just one isolated group. Only after collecting the myriad particulars is the naturalist then in the position to complete his study by generalizing from his inquiry.

Although Buffon sought universal laws and held physics as his model of a mature science, he tended to regard nature from an historical point of view; that is to say, he believed that in order to understand our world as we observe it we need to know not only the laws by which it is ruled but also its historical development. In his early writings Buffon stressed this temporal dimension primarily in his geological writings. For him an account of the surface phenomena of the earth was intelligible only with reference to the geological laws *and* to the history of our solar system. As for the living world, Buffon held that the environment determined zoogeography and modified in minor ways the appearance of animals.

Daubenton's early statements on method, written in his article "De la description des animaux,"¹¹ concur with many of Buffon's. Like Buffon, Daubenton expressed contempt for naturalists who merely classify the products of nature or who publish incomplete descriptions. For Daubenton exact description, internal and external, is essential for natural history:

Description is one of the principal components of the natural history of animals since the other components depend upon it for a certain and clear understanding of the facts. This is because it is only after having carefully observed each animal, interior and exterior, that one can discover the workings of their organs and understand their different operations.¹²

Although Daubenton agreed with Buffon on several points, the basic orientation of his thought was quite different. One can clearly see this in Daubenton's distinction between natural history and anatomy. According to him, both of these disciplines—one partially, the other exclusively—attempt the exact description of the internal parts of animals; "however the descriptions of the naturalists must be made differently from those of the anatomists because the object of natural history is not precisely the same as that of anatomy."¹³ Daubenton went on to explain that the anatomist concentrates his attention on analysis, whereas the naturalist synthesizes analyses and comparisons into general statements about "the animal economy, which is the principal object of natural history."¹⁴ The distinction, then, is that the anatomist dexterously explores the most minute structures of animals, as opposed to the naturalist,

¹¹ Buffon, *Histoire naturelle*, Vol. IV (1753), pp. 113–141.

¹² *Ibid.*, p. 113. Translations are mine unless noted otherwise.

¹³ *Ibid.*, p. 126.

¹⁴ *Ibid.*, p. 135.

who describes only essential parts in an attempt to understand the plan and workings of the animal body. For this reason Daubenton always considered himself a naturalist, not an anatomist. His definitions, however, never were widely accepted, nor will they be adopted here. What is interesting about the distinction is that it reveals Daubenton's fundamentally morphological understanding of the aim of natural history, which was very much within the tradition of men like Claude Perrault (1608–1680), who by practicing comparative anatomy believed that they were advancing the knowledge of natural history.

Daubenton wrote:

I would have liked to examine all the species of animals, if it were possible to find them, and my plan has been to observe them, the interior as well as the exterior, in order to describe the proportions of the principal parts of their bodies. This would be of value because the description of the exterior parts suffices to distinguish each animal, and the description of the interior parts can give an idea of the principal organs which are of use to animals as well as of the modification of each of these organs in different species. Such an exposition of the animal body can provide, by various comparisons, important results for [a study of the] animal economy, which is the principal object of natural history.¹⁵

From the very beginning, then, Daubenton was interested in the basic structure of the animal body. There is nothing in this that is irreconcilable with Buffon's initial position. One might say that Buffon's perspective was wider and included comparative anatomy as one of the elements basic for an understanding of natural history. The differences in their points of view, however, are not to be ignored. Buffon in general saw nature from an historical perspective, and his introductory discourse on method is followed by a lengthy discourse on the origin and development of the earth. Although Buffon was not concerned with the historical development of animals at this time, his tendency was toward a dynamic framework, whereas Daubenton's tendency was toward a static framework. The consequences of this bifurcation became increasingly profound as time progressed.

CONCEPT OF NATURAL HISTORY: DEVELOPMENT OF IDEAS

Between 1749 and 1767 Buffon published fifteen volumes of the *Histoire naturelle*. The first three deal with general considerations; the remaining twelve describe each of the then known quadrupeds. In the beginning volumes Buffon used as a unifying concept the Chain of Being:¹⁶ he believed that all animals can be arranged on a scale from the simplest forms to the most complex. The links of the chain consist of individuals—individuals, however, with an important historical background. Although Buffon worked within the Lockean tradition that rejected the existence of real essences, he went beyond the idea

¹⁵ *Ibid.*

¹⁶ For a complete discussion of the history of this idea see Arthur O. Lovejoy, *The Great Chain of Being* (Cambridge, Mass.: Harvard University Press, 1936).

of nominal essences in believing that there is a real biological base for species that can be tested by a breeding criterion.¹⁷ What Buffon meant was that individuals that can breed together and produce fertile offspring come from the same stock; hence dogs are different from foxes, and horses are different from asses. Variation within a species is merely the product of environmental influence on animals and their offspring. Buffon wrote:

There exists in nature a general prototype in each species upon which all individuals are molded. The individuals, however, are altered or improved, depending on the circumstances in the process of realization. Relative to certain characteristics, then, there is an irregular appearance in the succession of individuals, yet at the same time, there is a striking constancy in the species considered as a whole. The first animal, the first horse for example, was the exterior model and the internal mold from which all past, present, and future horses have been formed. But this model, of which we know only copies, could alter or improve itself in imparting its form or in multiplying. The original imprint subsists in its entirety in each individual; and although there have existed millions of these, not one of them is exactly like another, nor consequently, like the model of which it bears the imprint.¹⁸

The biological base for Buffon's concept of species¹⁹ is provided by his theory of generation, which he published in the second volume of the *Histoire naturelle*. The theory relies on an analogy to a universal force in nature—gravity. This analogous force, the *moule intérieur*, is responsible for the internal and external form of animals. A species, then, is a “constant succession of similar individuals that can reproduce together.”²⁰ In time they have changed and in time they will change even more. In his early writings Buffon considered the production of varieties within a species as the limit of possible change. Between 1753 and 1765, however, his thought developed in such a manner as to make him rethink the limits of change.

In large part Buffon's ideas were modified through contact with empirical data. For example, during these years he increasingly came across reports of the existence of hybrids. Buffon was so interested in the subject that in addition to keeping records of reported cases, he even had various crosses attempted on his estate. His interest was natural enough, for since he considered the basic unit of natural history to be the species defined by a breeding criterion, if individuals of different species could breed together successfully and produce fertile offspring, then either his breeding definition or his species concept was inadequate.

At the same time that Buffon was concerned with hybrids he was also grappling with the problem of organizing large amounts of data. The quadrupeds were

¹⁷ Professor Phillip Sloan of the Department of Biomedical History at the University of Washington has carefully studied the relationship of Buffon's thought to Locke's philosophy. His paper on this subject, read at the History of Science Society 1972 meeting in Washington, D.C., will be published soon.

¹⁸ *O.P.*, p. 352.

¹⁹ For a discussion of the development of Buffon's concept of species see Paul L. Farber, “Buffon and the Concept of Species,” *Journal of the History of Biology*, 1972, 5:259–284.

²⁰ *O.P.*, p. 356.

not much of a problem, since at that time only about two hundred different species were known. The next group that Buffon wished to study, the birds, numbered closer to two thousand. Considering that it would take Buffon over twenty years to describe the quadrupeds, we can well imagine his consternation at confronting a group larger by tenfold.

In addition to the ornithological quagmire in which Buffon found himself he also was attempting to understand the relation between Old and New World animals. The influx of scientific information coming from Africa and the New World as well as from Eastern Europe and Russia made it possible in the eighteenth century to undertake seriously such a question. Since Buffon held that geologically the New World was more recent and less perfect than the Old World, he may have speculated that New World species were merely modified Old World species. If so, he would have to alter his beliefs concerning the limits of change in species.

In 1765 Buffon synthesized the disparate issues that had concerned him for well over two decades. In that year he completed his research on the quadrupeds and prepared a chapter that he intended as a summary of the first section of the *Histoire naturelle*. His chapter, "De la dégénération des animaux," published in 1766, was more than a summing up, however. In it Buffon proposed a natural system of classification based upon geographical distribution, morphological similarities, and hereditary relationships. He began his argument by noting that the appearance of many varieties found in the wild or among domesticated animals could be explained by reference to action of the environment or the influence of diet. From these commonplace views he moved on to a less conventional one:

After considering varieties that represent particular changes in each species, a more important consideration with further reaching consequences presents itself: that of the changing of species themselves. It is this older and from time immemorial degeneration that seems to have been made in each family, or if one wishes, in each of the genera under which we can place similar neighboring species.²¹

What Buffon envisioned was the production, in time, of natural genera created by the gradual modification of species. For each genus or family (Buffon used the two words interchangeably) there was an original *premier souche* that had degenerated into several recognizably different varieties, what we commonly call species. One could show that all the individuals came from a common ancestor by noting their morphological similarity and their alleged ability to interbreed.²²

Buffon's use of the concept of natural families was a brilliant move. It allowed him to overcome the difficulties of explaining the existence of hybrids: they were now considered confirmation of the relationship of morphologically similar

²¹ *Ibid.*, p. 401.

²² This did not contradict Buffon's theory of generation, for he now assumed that there was a *moule intérieur* for each *premier souche*. Different varieties could be explained as different expressions of the *moule intérieur*.

animals like the horse and the ass. His hypothesis made sense of his data on the geographic distribution of animals by noting that unique environments produce unique expressions of the *moule intérieur*. Similarly, his hypothesis explained the relationship of Old to New World fauna. And lastly, it provided a key for investigating the remaining phenomena of natural history in a manageable fashion, for he could now legitimately use some higher taxa for organizing large groups like the birds.

Although his ideas were highly speculative and had certain philosophical problems, Buffon's synthesis stands as his most mature statement concerning the living world, for it was based on over two decades of research and provided the organizing principles for the rest of his labors. His study of birds is organized according to families, which allowed him to treat that enormous group in only nine volumes, and his work in geology, which ultimately led to the publication of "Des Époques de la nature,"²³ can be viewed as an extension of the views published in "De la dégénération des animaux."

What is important for the present study is the overall perspective of Buffon's thought rather than the specific details. Although Buffon continued to write of a scale of nature, he conceived the unifying principle in natural history to be the historical development of the earth and its inhabitants. This development follows certain basic laws, but they are not laws that describe a static nature; they are laws that govern change. It is only with an understanding of the dynamic aspects of nature, according to Buffon, that we can fully understand the present appearance of natural objects. When applied to animals, this means that the study of animal form must be conducted with an awareness of the temporal dimension, and that a real understanding of the form of contemporary species is impossible without reference to their history.

Daubenton's writings between 1749 and 1765 stand in marked contrast to those of Buffon, for Daubenton's investigations suggest a timeless and static framework. In article after article he deftly described internal and external morphology,²⁴ with the entire thrust of these studies being to document precisely the structure of each species.

Like Buffon, Daubenton in his early investigations held a definition of species based on a breeding criterion. It was useful to him, since some species, the horse and the ass for instance, are so similar that it is easy to be misled into thinking that they are one species. This definition, as we have seen above, was reinterpreted by Buffon in later years. Daubenton, although he never rejected or reformulated Buffon's original definition of species, merely emphasized it less and stressed morphology more. For instance, in a paper on shrews, published in the *Mémoires* of the Académie Royale des Sciences, Daubenton stated that while a breeding criterion is a clear one, it is not a very practical one, since we know very little concerning interbreeding among wild animals.

²³ For a discussion of Buffon's geological views and their relationship to his general philosophy see the introduction by Jacques Roger to the critical edition of "Des Époques de la nature," *Mémoires du Muséum national d'Histoire naturelle*, 1962, Ser. C, 10:xv-cxlix.

²⁴ The only exceptions are where his material was insufficient, e.g., rare New World animals of which he had only a skin or skeleton.

In this particular article Daubenton opted for distinguishing among shrews by constant morphological features. Color is not a good guide because it is so variable; however,

Difference in the shape and in the proportions of the various parts of the body seem to be characteristics less uncertain for designating different species, assuming that they are constant and invariable, at least in the narrow limits which are prescribed by Nature for the resemblance of the individuals of each species of wild animals. It is on these principles that I shall distinguish two species of shrew.²⁵

In later years Daubenton tended to move even closer to a wholly morphological definition of species. In the introduction to the *Encyclopédie méthodique* (1782), for instance, he wrote:

All these taxonomic divisions into orders, classes, genera depend on the wishes of the naturalist who imagines them. They are not indicated by the nature of things. The same objects are differently classified by different writers, and sometimes by the same writer.

Only individuals are real and distinct among the plants and animals. Collections of similar individuals compose species, these existing in their individuals. Specific characteristics, that is those which distinguish species, are essential to the individuals, they do not depend on the wish of the naturalist. They are not faulty, and in this regard only, the systems are infallible because they represent nature.²⁶

Similarly, in his lectures on natural history delivered at the *École Normale*, the *Collège de France*, and the *École d'Alfort*, he stated:

Each species is the collection of individuals that have the essential characteristics of this species, but it is difficult to determine these characteristics. One does not know at what point the individuals of the same species should resemble one another or can differ from one another.²⁷

Although some species are very difficult to distinguish, and a breeding criterion is used to show that all the races of dog belong to the same species, Daubenton insisted:

By examining the structure of animals one can obtain from comparative anatomy some information of specific characteristics. In studying this science one compares successively the principal parts of the body of one animal with those which correspond to them in other species of animal or in other individuals of the same species. It is the only means to identify exactly the similarities and differences which are found among animals, and to determine different degrees of value for distinctive structural characteristics.²⁸

²⁵ Louis-Jean-Marie Daubenton, "Sur les Musaraignes, et en particulier sur une nouvelle espèce de Musaraigne qui se trouve en France, et qui n'a pas été remarquée," *Histoire de l'Académie Royale des sciences. Année MDCCLVI. Avec les Mémoires de mathématique & de physique pour la même année*, 1756, pp. 203–213.

²⁶ Louis-Jean-Marie Daubenton, "Introduction à l'histoire naturelle," *Encyclopédie méthodique* (Paris: Panckoucke, 1782), Vol. I, p. iii.

²⁷ Bibliothèque du Muséum national d'Histoire naturelle, MS 807, p. 1.

²⁸ *Ibid.*, pp. 1–2.

Comparative anatomy was central for Daubenton's thinking. It was at the heart of his method, and his work in it was his greatest contribution to the development of the natural sciences. As conceived by him it came to be a means of understanding the essential characteristics of individuals, which for Daubenton meant the characteristics without which the animal could not properly function. A unique set of these characteristics defined each species. Since Daubenton considered the animal organism an intricate and integrated mechanism, it was impossible for him to accept the modification of species in time. Color might vary, overall size might fluctuate, but a change in an essential characteristic would lead to a disruption of the basic unit and hence to malfunction or mortality.

CONCEPTS OF NATURAL HISTORY: CONFLICT

What must Daubenton have thought when confronted with the ideas that Buffon published in 1766 in his article "De la dégénération des animaux"? To a naturalist as exact and cautious as Daubenton it must have appeared a very bold speculation, perhaps a brilliant one. But what evidence existed to verify such a hypothesis? The fossil record was fragmentary and inconclusive; information on hybrids was scant. Moreover, the implications of the hypothesis were disturbing, for according to Buffon what we normally take to be species are really constant varieties produced by the influence of the environment on the expression of a *moule intérieur*. The meticulous analysis of each species, then, is actually a study of the expression of a *moule intérieur* at a particular time and place and not a study of the essential characteristics of a species. The entire worth of Daubenton's work becomes considerably devalued by Buffon's new position. In fact, one might argue, why even continue to elaborate on each variation within a family? From comparative anatomy one could perhaps reveal family characteristics. However, Daubenton never undertook such a task or modified his views in that direction.

It is of course impossible to know specifically what Daubenton thought about Buffon's hypothesis, and we will never know whether he saw these implications. Buffon, on the other hand, seems to have grasped the significance of his own theory, for in the next section of the *Histoire naturelle* he presented the birds by family and omitted detailed anatomical descriptions of species from the format.²⁹

We still do not know whether Buffon's or Daubenton's vanity played a role in the final split. I think, however, that considering the direction each had taken between 1749 and 1765, the particular circumstances surrounding their final break are of minor importance in understanding the termination of a

²⁹Georges-Louis Leclerc de Buffon, *Histoire naturelle des oiseaux* (Paris: Imprimerie Royale, 1770-1783). The prospectus sent out to advertise the *Histoire naturelle des oiseaux* states that while the anatomical studies of quadrupeds were necessary inasmuch as they shed light on human anatomy, the anatomical study of birds, which are further removed, will be greatly reduced ("Histoire Naturelle des Oiseaux, par M. de Buffon," Paris, n.d., p. 2).

long and fruitful collaboration. Buffon, after years of inquiry, felt that he had finally discovered the key to understanding natural history: animals have changed in time because of a changing environment. The diversity of form found in nature is indicative of a long development of several basic plans, and what natural history could and should attempt is the identification of these basic plans and the investigation of the processes of change in the environment. In contrast, Daubenton, after years of dissection, felt that he had identified the essential characteristics of species. Higher taxa for him are a figment of the classifier's imagination and are at best a convenient tool for grouping large amounts of data. Considering these two positions, we can understand why Buffon and Daubenton ceased to work together: their relationship no longer made sense. What Daubenton had to offer was not as valuable to Buffon as before, and what Buffon wanted to undertake next—the description of birds by family—was not suited to Daubenton's more analytical skills.

SIGNIFICANCE

The termination of Buffon's and Daubenton's joint effort to describe nature reflects more than just the parting of two naturalists from a common project. In their disagreement we can see a separation between two basic views of the living world. For Buffon animal form can be fully understood only with reference to the history of species. This means that to comprehend modern species we need to work within a framework that includes geology, geographic distribution, inter- and intraspecific relationships, and laws of change. Comparative anatomy, for Buffon, comprises only one of the many facets of natural history.

For Daubenton, however, comparative anatomy lays claim to being the queen of the sciences of living beings. For it is through an exacting investigation of animal form that one can discover the essential characteristics of species as well as obtain an understanding of the animal economy. By focusing his attention on the details of the mechanism of life, Daubenton was led to picture nature in static terms, and it was inconceivable to him that the delicate interrelationships of animal organs and parts could undergo drastic modification due to environmental change.³⁰

Historians attempting to understand the history of late-eighteenth- and early-nineteenth-century biology may wish to consider this point of bifurcation in the approach to nature. Were the ramifications stemming from the internal tensions of the *Histoire naturelle* of significance for later disagreements or conflicts? Did one perspective come to dominate, and if so, what happened to the other? Whatever our final conclusions may be concerning these and related questions, we should note in closing that it is unlikely that either Buffon

³⁰I do not wish to imply that it is inconsistent to focus attention on morphology and animal economy and to believe in the gradual modification of animal form—one thinks immediately of Étienne Geoffroy Saint-Hilaire. For Daubenton, however, the two viewpoints appeared dichotomous.

or Daubenton appreciated the historical importance of their differences. But for us, living two hundred years later, it appears to suggest a divergence of opinion of great significance. It also adds another dimension of interest to an already immensely interesting classic in the history of science, the *Histoire naturelle, générale et particulière*.