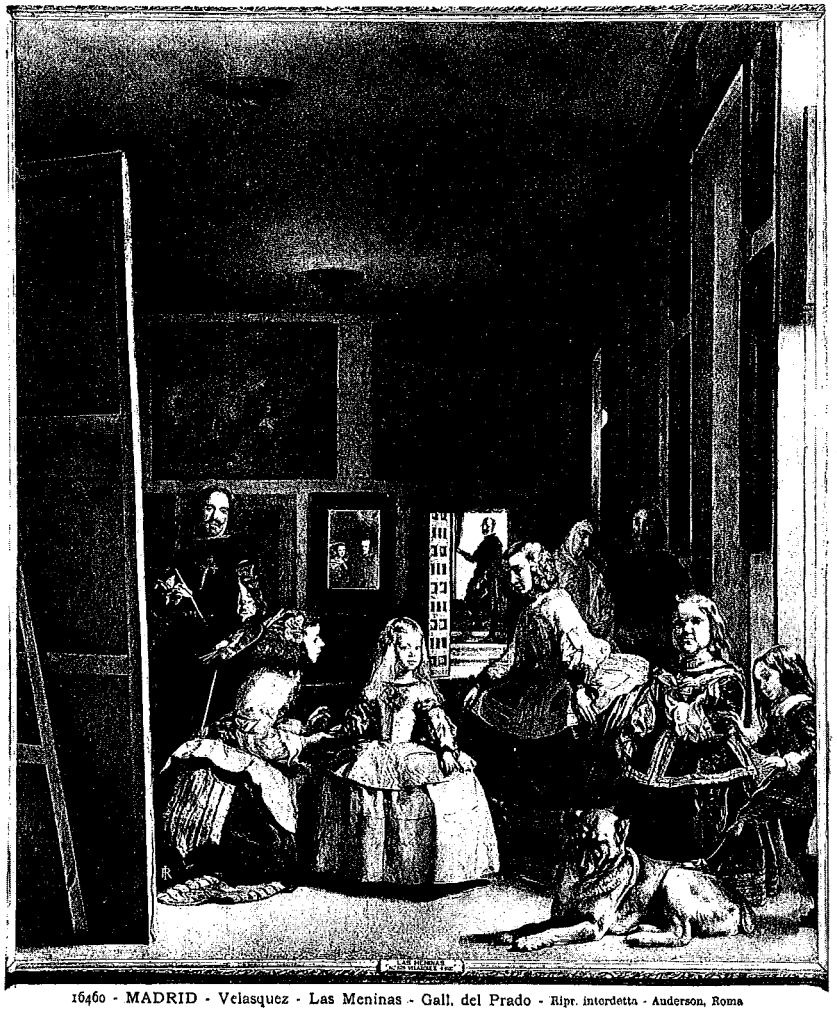

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THE ORDER OF THINGS

An Archaeology of the Human Sciences

MICHEL FOUCAULT

A translation of *Les Mots et les choses*

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[93] Du Marsais, *Traité des tropes* (1811 edn., pp. 150–1).
[94] Ibid., p. 2.
[95] Rousseau, *Essai sur l'origine des langues*, pp. 152–3.
[96] De Brosses, *Traité de la prononciation mécanique*, p. 267.

CHAPTER 5

Classifying

I WHAT THE HISTORIANS SAY

Histories of ideas or of the sciences – by which is meant here an average cross-section of them – credit the seventeenth century, and especially the eighteenth, with a new curiosity: the curiosity that caused them, if not to discover the sciences of life, at least to give them a hitherto unsuspected scope and precision. A certain number of causes and several essential manifestations are traditionally attributed to this phenomenon.

On the side of origins or motives, we place the new privileges accorded to observation: the powers attributed to it since Bacon and the technical improvements introduced in it by the invention of the microscope. Alongside these is set the then recently attained prestige of the physical sciences, which provided a model of rationality; since it had proved possible, by means of experimentation and theory, to analyse the laws of movement or those governing the reflection of light beams, was it not normal to seek, by means of experiments, observations, or calculations, the laws that might govern the more complex but adjacent realm of living beings? Cartesian mechanism, which subsequently proved an obstacle, was used at first, the historians tell us, as a sort of instrument of transference, and led, rather in spite of itself, from mechanical rationality to the discovery of that other rationality which is that of the living being. Still on the side of causes, and in a somewhat pell-mell fashion, the historians of ideas place a variety of new interests: the economic attitude towards agriculture – the Physiocrats' beliefs were evidence of this, but so too were the first efforts to create an agronomy; then, half-way between husbandry and theory, a curiosity with regard to exotic plants and animals, which attempts were made to acclimatize, and of which the great voyages of inquiry or exploration – that of Tournefort to the Middle East, for example, or that of Adanson to Senegal – brought back

descriptions, engravings, and specimens; and then, above all, the ethical valorization of nature, together with the whole of that movement, ambiguous in its principle, by means of which – whether one was an aristocrat or a bourgeois – one 'invested' money and feeling into a land that earlier periods had for so long left fallow. Rousseau, at the heart of the eighteenth century, was a student of botany.

In their list of manifestations, the historians then include the varied forms that were taken by these new sciences of life, and the 'spirit', as they put it, that directed them. Apparently, under the influence of Descartes, they were mechanistic to begin with, and continued to be so to the end of the seventeenth century; then the first efforts of an infant chemistry made its imprint upon them, but throughout the eighteenth century the vitalist themes are thought to have attained or returned to their privileged status, finally coalescing to form a unitary doctrine – that 'vitalism' which in slightly differing forms was professed by Bordeu and Barthez in Montpellier, by Blumenbach in Germany, and by Diderot then Bichat in Paris. Under these different theoretical regimens, questions were asked that were almost always the same but were given each time a different solution: the possibility of classifying living beings – some, like Linnaeus, holding that all of nature can be accommodated within a taxonomy, others, like Buffon, holding that it is too rich and various to be fitted within so rigid a framework; the generative process, with the more mechanistically minded in favour of preformation, and others believing in the specific development of germs; analysis of functions (circulation after Harvey, sensation, motivity, and, towards the end of the century, respiration).

After examining these problems and the discussions they give rise to, it is simple enough for the historians to reconstruct the great controversies that are said to have divided men's opinions and passions, as well as their reasoning. By these means they believe that they can discover the traces of a major conflict between a theology that sees the providence of God and the simplicity, mystery, and foresight of his ways residing beneath each form and in all its movements, and a science that is already attempting to define the autonomy of nature. They also recognize the contradiction between a science still too attached to the old pre-eminence of astronomy, mechanics, and optics, and another science that already suspects all the irreducible and specific contents there may be in the realms of life. Lastly, the historians see the emergence, as though before their very eyes, of an opposition between those who believe in the immobility

of nature – in the manner of Tournefort, and above all Linnaeus – and those who, with Bonnet, Benoît de Maillet, and Diderot, already have a presentiment of life's creative powers, of its inexhaustible power of transformation, of its plasticity, and of that movement by means of which it envelops all its productions, ourselves included, in a time of which no one is master. Long before Darwin and long before Lamarck, the great debate on evolution would appear to have been opened by the *Telliamed*, the *Palingénésie* and the *Rêve de d'Alembert*. Mechanism and theology, supporting one another or ceaselessly conflicting with one another, tended to keep the Classical age as close as possible to its origin – on the side of Descartes and Malebranche; whereas, opposite them, irreligion and a whole confused intuition of life, conflicting in turn (as in Bonnet) or acting as accomplices (as with Diderot), are said to be drawing it towards its imminent future – towards the nineteenth century, which is supposed to have provided the still obscure and fettered endeavours of the eighteenth with their positive and rational fulfilment in a science of life which did not need to sacrifice rationality in order to preserve in the very quick of its consciousness the specificity of living things, and that somewhat subterranean warmth which circulates between them – the object of our knowledge – and us, who are here to know them.

It would be pointless to go back over the presuppositions inherent in such a method. Let it suffice here to point out its consequences: the difficulty of apprehending the network that is able to link together such diverse investigations as attempts to establish a taxonomy and microscopic observations; the necessity of recording as observed facts the conflicts between those who were fixists and those who were not, or between the experimentalists and the partisans of the system; the obligation to divide knowledge into two interwoven fabrics when in fact they were alien to one another – the first being defined by what was known already and from elsewhere (the Aristotelian or scholastic inheritance, the weight of Cartesianism, the prestige of Newton), the second by what still remained to be known (evolution, the specificity of life, the notion of organism); and above all the application of categories that are strictly anachronistic in relation to this knowledge. Obviously, the most important of all these refers to life. Historians want to write histories of biology in the eighteenth century; but they do not realize that biology did not exist then, and that the pattern of knowledge that has been familiar to us for a hundred and fifty years is not valid for a previous period. And that, if biology was unknown, there was a very simple reason for it: that

life itself did not exist. All that existed was living beings, which were viewed through a grid of knowledge constituted by *natural history*.

II NATURAL HISTORY

How was the Classical age able to define this realm of 'natural history', the proofs and even the unity of which now appear to us so distant, and as though already blurred? What is this field in which nature appeared sufficiently close to itself for the individual beings it contained to be classified, and yet so far removed from itself that they had to be so by the medium of analysis and reflection?

One has the impression – and it is often expressed – that the history of nature must have appeared as Cartesian mechanism ebbed. When it had at last become clear that it was impossible to fit the entire world into the laws of rectilinear movement, when the complexity of the vegetable and animal kingdoms had sufficiently resisted the simple forms of extended substance, then it became necessary for nature to manifest itself in all its strange richness; and the meticulous observation of living beings was thus born upon the empty strand from which Cartesianism had just withdrawn. Unfortunately, things do not happen as simply as that. It is quite possible – though it would be a matter requiring careful scrutiny – that one science can arise out of another; but no science can be generated by the absence of another, or from another's failure, or even from some obstacle another has encountered. In fact, the possibility of natural history, with Ray, Jonston, Christophorus Knauth, is contemporaneous with Cartesianism itself, and not with its failure. Mechanism from Descartes to d'Alembert and natural history from Tournefort to Daubenton were authorized by the same *episteme*.

For natural history to appear, it was not necessary for nature to become denser and more obscure, to multiply its mechanisms to the point of acquiring the opaque weight of a history that can only be retraced and described, without any possibility of measuring it, calculating it, or explaining it; it was necessary – and this is entirely the opposite – for History to become Natural. In the sixteenth century, and right up to the middle of the seventeenth, all that existed was histories: Belon had written a *History of the nature of birds*; Duret, an *Admirable history of plants*; Aldrovandi, a *History of serpents and dragons*. In 1657, Jonston published a *Natural history of quadrupeds*. This date of birth is not, of course, absolutely definitive[1]; it is there only to symbolize a landmark, and to indicate,

from afar, the apparent enigma of an event. This event is the sudden separation, in the realm of *Historia*, of two orders of knowledge henceforward to be considered different. Until the time of Aldrovandi, History was the inextricable and completely unitary fabric of all that was visible of things and of the signs that had been discovered or lodged in them: to write the history of a plant or an animal was as much a matter of describing its elements or organs as of describing the resemblances that could be found in it, the virtues that it was thought to possess, the legends and stories with which it had been involved, its place in heraldry, the medicaments that were concocted from its substance, the foods it provided, what the ancients recorded of it, and what travellers might have said of it. The history of a living being was that being itself, within the whole semantic network that connected it to the world. The division, so evident to us, between what we see, what others have observed and handed down, and what others imagine or naïvely believe, the great tripartition, apparently so simple and so immediate, into *Observation*, *Document*, and *Fable*, did not exist. And this was not because science was hesitating between a rational vocation and the vast weight of naïve tradition, but for the much more precise and much more constraining reason that signs were then part of things themselves, whereas in the seventeenth century they become modes of representation.

When Jonston wrote his *Natural history of quadrupeds*, did he know any more about them than Aldrovandi did, a half-century earlier? Not a great deal more, the historians assure us. But that is not the question. Or, if we must pose it in these terms, then we must reply that Jonston knew a great deal less than Aldrovandi. The latter, in the case of each animal he examined, offered the reader, and on the same level, a description of its anatomy and of the methods of capturing it; its allegorical uses and mode of generation; its habitat and legendary mansions; its food and the best ways of cooking its flesh. Jonston subdivides his chapter on the horse under twelve headings: name, anatomical parts, habitat, ages, generation, voice, movements, sympathy and antipathy, uses, medicinal uses[2]. None of this was omitted by Aldrovandi, and he gives us a great deal more besides. The essential difference lies in what is *missing* in Jonston. The whole of animal semantics has disappeared, like a dead and useless limb. The words that had been interwoven in the very being of the beast have been unravelled and removed: and the living being, in its anatomy, its form, its habits, its birth and death, appears as though stripped naked. Natural history finds its locus in the gap that is now opened up between

things and words – a silent gap, pure of all verbal sedimentation, and yet articulated according to the elements of representation, those same elements that can now without let or hindrance be named. Things touch against the banks of discourse because they appear in the hollow space of representation. It is not therefore at the moment when one gives up calculation that one finally begins to observe. We must not see the constitution of natural history, with the empirical climate in which it develops, as an experiment forcing entry, willy-nilly, into a knowledge that was keeping watch on the truth of nature elsewhere; natural history – and this is why it appeared at precisely this moment – is the space opened up in representation by an analysis which is anticipating the possibility of naming; it is the possibility of *seeing* what one will be able to *say*, but what one could not say subsequently, or see at a distance, if things and words, distinct from one another, did not, from the very first, communicate in a representation. The descriptive order proposed for natural history by Linnaeus, long after Jonston, is very characteristic. According to this order, every chapter dealing with a given animal should follow the following plan: name, theory, kind, species, attributes, use, and, to conclude, *Litteraria*. All the language deposited upon things by time is pushed back into the very last category, like a sort of supplement in which discourse is allowed to recount itself and record discoveries, traditions, beliefs, and poetical figures. Before this language of language, it is the thing itself that appears, in its own characters, but within the reality that has been patterned from the very outset by the name. The constitution of a natural science in the classical age is not the effect, either direct or indirect, of the transference of a rationality formed elsewhere (for geometrical or mechanical purposes). It is a separate formation, one that has its own archaeology, even though it is linked (though in a correlative and simultaneous mode) to the general theory of signs and to the project for a universal mathesis.

Thus the old word 'history' changes its value, and perhaps rediscovers one of its archaic significations. In any case, though it is true that the historian, for the Greeks, was indeed the individual who *sees* and who recounts from the starting-point of his sight, it has not always been so in our culture. Indeed, it was at a relatively late date, on the threshold of the Classical age, that he assumed – or resumed – this role. Until the mid-seventeenth century, the historian's task was to establish the great compilation of documents and signs – of everything, throughout the world, that might form a mark, as it were. It was the historian's responsibility to

restore to language all the words that had been buried. His existence was defined not so much by what he saw as by what he retold, by a secondary speech which pronounced afresh so many words that had been muffled. The Classical age gives history a quite different meaning: that of undertaking a meticulous examination of things themselves for the first time, and then of transcribing what it has gathered in smooth, neutralized, and faithful words. It is understandable that the first form of history constituted in this period of 'purification' should have been the history of nature. For its construction requires only words applied, without intermediary, to things themselves. The documents of this new history are not other words, texts or records, but unencumbered spaces in which things are juxtaposed: herbariums, collections, gardens; the locus of this history is a non-temporal rectangle in which, stripped of all commentary, of all enveloping language, creatures present themselves one beside another, their surfaces visible, grouped according to their common features, and thus already virtually analysed, and bearers of nothing but their own individual names. It is often said that the establishment of botanical gardens and zoological collections expressed a new curiosity about exotic plants and animals. In fact, these had already claimed men's interest for a long while. What had changed was the space in which it was possible to see them and from which it was possible to describe them. To the Renaissance, the strangeness of animals was a spectacle: it was featured in fairs, in tournaments, in fictitious or real combats, in reconstitutions of legends in which the bestiary displayed its ageless fables. The natural history room and the garden, as created in the Classical period, replace the circular procession of the 'show' with the arrangement of things in a 'table'. What came surreptitiously into being between the age of the theatre and that of the catalogue was not the desire for knowledge, but a new way of connecting things both to the eye and to discourse. A new way of making history.

We also know what methodological importance these 'natural' allocations assumed, at the end of the eighteenth century, in the classification of words, languages, roots, documents, records – in short, in the constitution of a whole environment of history (in the now familiar sense of the word) in which the nineteenth century was to rediscover, after this pure tabulation of things, the renewed possibility of talking about words. And of talking about them, not in the style of commentary, but in a mode that was to be considered as positive, as objective, as that of natural history.

The ever more complete preservation of what was written, the establishment of archives, then of filing systems for them, the reorganization of libraries, the drawing up of catalogues, indexes, and inventories, all these things represent, at the end of the Classical age, not so much a new sensitivity to time, to its past, to the density of history, as a way of introducing into the language already imprinted on things, and into the traces it has left, an order of the same type as that which was being established between living creatures. And it is in this classified time, in this squared and spatialized development, that the historians of the nineteenth century were to undertake the creation of a history that could at last be 'true' – in other words, liberated from Classical rationality, from its ordering and theodicy: a history restored to the irruptive violence of time.

III STRUCTURE

Thus arranged and understood, natural history has as a condition of its possibility the common affinity of things and language with representation; but it exists as a task only in so far as things and language happen to be separate. It must therefore reduce this distance between them so as to bring language as close as possible to the observing gaze, and the things observed as close as possible to words. Natural history is nothing more than the nomination of the visible. Hence its apparent simplicity, and that air of naïveté it has from a distance, so simple does it appear and so obviously imposed by things themselves. One has the impression that with Tournefort, with Linnaeus or Buffon, someone has at last taken on the task of stating something that had been visible from the beginning of time, but had remained mute before a sort of invincible distraction of men's eyes. In fact, it was not an age-old inattentiveness being suddenly dissipated, but a new field of visibility being constituted in all its density.

Natural history did not become possible because men looked harder and more closely. One might say, strictly speaking, that the Classical age used its ingenuity, if not to see as little as possible, at least to restrict deliberately the area of its experience. Observation, from the seventeenth century onward, is a perceptible knowledge furnished with a series of systematically negative conditions. Hearsay is excluded, that goes without saying; but so are taste and smell, because their lack of certainty and their variability render impossible any analysis into distinct elements that could be universally acceptable. The sense of touch is very narrowly limited to the designation of a few fairly evident distinctions (such as that

between smooth and rough); which leaves sight with an almost exclusive privilege, being the sense by which we perceive extent and establish proof, and, in consequence, the means to an analysis *partes extra partes* acceptable to everyone: the blind man in the eighteenth century can perfectly well be a geometrician, but he cannot be a naturalist[3]. And, even then, everything that presents itself to our gaze is not utilizable: colours especially can scarcely serve as a foundation for useful comparisons. The area of visibility in which observation is able to assume its powers is thus only what is left after these exclusions: a visibility freed from all other sensory burdens and restricted, moreover, to black and white. This area, much more than the receptivity and attention at last being granted to things themselves, defines natural history's condition of possibility, and the appearance of its screened objects: lines, surfaces, forms, reliefs.

It may perhaps be claimed that the use of the microscope compensates for these restrictions; and that though sensory experience was being restricted in the direction of its more doubtful frontiers, it was nevertheless being extended towards the new objects of a technically controlled form of observation. In fact, it was the same complex of negative conditions that limited the realm of experience and made the use of optical instruments possible. To attempt to improve one's power of observation by looking through a lens, one must renounce the attempt to achieve knowledge by means of the other senses or from hearsay. A change of scale in the visual sphere must have more value than the correlations between the various kinds of evidence that may be provided by one's impressions, one's reading, or learned compilations. Though indefinite confinement of the visible within its own extent is made more easily perceptible to the eye by a microscope, it is nevertheless not freed from it. And the best proof of this is probably that optical instruments were used above all as a means of resolving problems of generation. In other words, as a means of discovering how the forms, arrangements, and characteristic proportions of individual adults, and of their species, could be handed on down the centuries while preserving their strictly defined identity. The microscope was called upon not to go beyond the frontiers of the fundamental domain of visibility, but to resolve one of the problems it posed: the maintenance of specific visible forms from generation to generation. The use of the microscope was based upon a non-instrumental relation between things and the human eye – a relation that defines natural history. It was Linnaeus, after all, who said that *Naturalia* – as opposed to *Coelestia* and *Elementa* – were intended to be transmitted

directly to the senses[4]. And Tournefort thought that, in order to gain a knowledge of plants, 'rather than scrutinize each of their variations with a religious scruple', it was better to analyse them 'as they fall beneath the gaze'[5].

To observe, then, is to be content with seeing – with seeing a few things systematically. With seeing what, in the rather confused wealth of representation, can be analysed, recognized by all, and thus given a name that everyone will be able to understand: 'All obscure similitudes,' said Linnaeus, 'are introduced only to the shame of art'[6]. Displayed in themselves, emptied of all resemblances, cleansed even of their colours, visual representations will now at last be able to provide natural history with what constitutes its proper object, with precisely what it will convey in the well-made language it intends to construct. This object is the extension of which all natural beings are constituted – an extension that may be affected by four variables. And by four variables only: the form of the elements, the quantity of those elements, the manner in which they are distributed in space in relation to each other, and the relative magnitude of each element. As Linnaeus said, in a passage of capital importance, 'every note should be a product of number, of form, of proportion, of situation'[7]. For example, when one studies the reproductive organs of a plant, it is sufficient, but indispensable, to enumerate the stamens and pistil (or to record their absence, according to the case), to define the form they assume, according to what geometrical figure they are distributed in the flower (circle, hexagon, triangle), and what their size is in relation to the other organs. These four variables, which can be applied in the same way to the five parts of the plant – roots, stem, leaves, flowers, fruits – specify the extension available to representation well enough for us to articulate it into a description acceptable to everyone: confronted with the same individual entity, everyone will be able to give the same description; and, inversely, given such a description everyone will be able to recognize the individual entities that correspond to it. In this fundamental articulation of the visible, the first confrontation of language and things can now be established in a manner that excludes all uncertainty.

Each visibly distinct part of a plant or an animal is thus describable in so far as four series of values are applicable to it. These four values affecting, and determining, any given element or organ are what botanists term its *structure*. 'By the structure of a plant's parts we mean the composition and arrangement of the pieces that make up its body.'[8] Struc-

ture also makes possible the description of what one sees, and this in two ways which are neither contradictory nor mutually exclusive. Number and magnitude can always be assigned by means of a count or a measure; they can therefore be expressed in quantitative terms. Forms and arrangements, on the other hand, must be described by other methods: either by identification with geometrical figures, or by analogies that must all be 'of the utmost clarity'[9]. In this way it becomes possible to describe certain fairly complex forms on the basis of their very visible resemblance to the human body, which serves as a sort of reservoir for models of visibility, and acts as a spontaneous link between what one can see and what one can say[10].

By limiting and filtering the visible, structure enables it to be transcribed into language. It permits the visibility of the animal or plant to pass over in its entirety into the discourse that receives it. And ultimately, perhaps, it may manage to reconstitute itself in visible form by means of words, as with the botanical calligrams dreamed of by Linnaeus[11]. His wish was that the order of the description, its division into paragraphs, and even its typographical modules, should reproduce the form of the plant itself. That the printed text, in its variables of form, arrangement, and quantity, should have a vegetable structure. 'It is beautiful to follow nature: to pass from the Root to the Stems, to the Petioles, to the Leaves, to the Peduncles, to the Flowers.' The description would have to be divided into the same number of paragraphs as there are parts in the plant, everything concerning its principal parts being printed in large type, and the analysis of the 'parts of parts' being conveyed in small type. One would then add what one knew of the plant from other sources in the same way as an artist completes his sketch by introducing the interplay of light and shade: 'the Adumbration would exactly contain the whole history of the plant, such as its names, its structure, its external assemblage, its nature, its use.' The plant is thus engraved in the material of the language into which it has been transposed, and recomposes its pure form before the reader's very eyes. The book becomes the herbarium of living structures. And let no one reply that this is merely the reverie of a systematizer and does not represent the whole of natural history. Buffon was a constant adversary of Linnaeus, yet the same structure exists in his work and plays the same role: 'The method of examination will be directed towards form, magnitude, the different parts, their number, their position, and the very substance of the thing'[12]. Buffon and Linnaeus employ the same grid; their gaze occupies the same surface of contact upon things;

there are the same black squares left to accommodate the invisible; the same open and distinct spaces to accommodate words.

By means of structure, what representation provides in a confused and simultaneous form is analysed and thereby rendered suitable to the linear unwinding of language. In effect, description is to the object one looks at what the proposition is to the representation it expresses: its arrangement in a series, elements succeeding elements. But it will be remembered that language in its empirical form implied a theory of the proposition and a theory of articulation. In itself, the proposition remained empty; and the ability of articulation to give form to authentic discourse was conditional upon its being linked together by the patent or secret function of the verb *to be*. Natural history is a science, that is, a language, but a securely based and well-constructed one: its propositional unfolding is indisputably an articulation; the arrangement of its elements into a linear series patterns representation according to an evident and universal mode. Whereas one and the same representation can give rise to a considerable number of propositions, since the names that embody it articulate it according to different modes, one and the same animal, or one and the same plant, will be described in the same way, in so far as their structure governs their passage from representation into language. The theory of *structure*, which runs right through natural history in the Classical age, superimposes the roles played in language by the *proposition* and *articulation* in such a way that they perform one and the same function.

And it is by this means that structure links the possibility of a natural history to the mathesis. In fact, it reduces the whole area of the visible to a system of variables all of whose values can be designated, if not by a quantity, at least by a perfectly clear and always finite description. It is therefore possible to establish the system of identities and the order of differences existing between natural entities. Adanson was of the opinion that one day it would be possible to treat botany as a rigorously mathematical science, and that it would prove permissible to pose botanical problems in the same way as one does algebraic or geometrical ones: 'find the most obvious point that establishes the line of separation or discussion between the scabious family and the honeysuckle family'; or again, find a known genus of plants (whether natural or artificial is unimportant) that stands exactly half-way between Dog's-bane and Borage[13]. By virtue of structure, the great proliferation of beings occupying the surface of the globe is able to enter both into the sequence of a descriptive language and into the field of a mathesis that would also be a general science

of order. And this constituent relation, complex as it is, is established within the apparent simplicity of a *description of the visible*.

All this is of great importance for the definition of natural history in terms of its object. The latter is provided by surfaces and lines, not by functions or invisible tissues. The plant and the animal are seen not so much in their organic unity as by the visible patterning of their organs. They are paws and hoofs, flowers and fruits, before being respiratory systems or internal liquids. Natural history traverses an area of visible, simultaneous, concomitant variables, without any internal relation of subordination or organization. In the seventeenth and eighteenth centuries anatomy lost the leading role that it had played during the Renaissance and that it was to resume in Cuvier's day; it was not that curiosity had diminished in the meantime, or that knowledge had regressed, but rather that the fundamental arrangement of the visible and the expressible no longer passed through the thickness of the body. Hence the epistemological precedence enjoyed by botany: the area common to words and things constituted a much more accommodating, a much less 'black' grid for plants than for animals; in so far as there are a great many constituent organs visible in a plant that are not so in animals, taxonomic knowledge based upon immediately perceptible variables was richer and more coherent in the botanical order than in the zoological. We must therefore reverse what is usually said on this subject: it is not because there was a great interest in botany during the seventeenth and eighteenth centuries that so much investigation was undertaken into methods of classification. But because it was possible to know and to say only within a taxonomic area of visibility, the knowledge of plants was bound to prove more extensive than that of animals.

At the institutional level, the inevitable correlatives of this patterning were botanical gardens and natural history collections. And their importance, for Classical culture, does not lie essentially in what they make it possible to see, but in what they hide and in what, by this process of obliteration, they allow to emerge: they screen off anatomy and function, they conceal the organism, in order to raise up before the eyes of those who await the truth the visible relief of forms, with their elements, their mode of distribution, and their measurements. They are books furnished with structures, the space in which characteristics combine, and in which classifications are physically displayed. One day, towards the end of the eighteenth century, Cuvier was to topple the glass jars of the Museum, smash them open and dissect all the forms of animal visibility that the

Classical age had preserved in them. This iconoclastic gesture, which Lamarck could never bring himself to make, does not reveal a new curiosity directed towards a secret that no one had the interest or courage to uncover, or the possibility of uncovering, before. It is rather, and much more seriously, a mutation in the natural dimension of Western culture: the end of *history* in the sense in which it was understood by Tournefort, Linnaeus, Buffon, and Adanson – and in the sense in which it was understood by Boissier de Sauvages also, when he opposed *historical* knowledge of the visible to *philosophical* knowledge of the invisible, of what is hidden and of causes[14]. And it was also to be the beginning of what, by substituting anatomy for classification, organism for structure, internal subordination for visible character, the series for tabulation, was to make possible the precipitation into the old flat world of animals and plants, engraved in black on white, a whole profound mass of time to which men were to give the renewed name of *history*.

IV CHARACTER

Structure is that designation of the visible which, by means of a kind of pre-linguistic sifting, enables it to be transcribed into language. But the description thus obtained is nothing more than a sort of proper noun: it leaves each being its strict individuality and expresses neither the table to which it belongs, nor the area surrounding it, nor the site it occupies. It is designation pure and simple. And for natural history to become language, the description must become a 'common noun'. It has been seen how, in spontaneous language, the primary designations, which concerned only individual representations, after having originated in the language of action and the resultant primitive roots, had little by little, through the momentum of derivation, acquired more general values. But natural history is a well-constructed language: it should not accept the constraint imposed by derivation and its forms; it should not lend credit to any etymology[15]. It should unite in one and the same operation what everyday language keeps separate: not only must it designate all natural entities very precisely, but it must also situate them within the system of identities and differences that unites them to and distinguishes them from all the others. Natural history must provide, simultaneously, a certain *designation* and a controlled *derivation*. And just as the theory of structure superimposed articulation and the proposition so that they became one and the same, so the theory of *character* must identify the values

that designate and the area in which they are derived. Tournefort says:

> To know plants is to know with precision the names that have been given to them in relation to the structure of some of their parts . . . The idea of the character that essentially distinguishes plants from one another ought invariably to be one with the name of each plant[16].

Establishing character is at the same time easy and difficult. Easy, because natural history does not have to establish a system of names based upon representations that are difficult to analyse, but only to derive it from a language that has already been unfolded in the process of description. The process of naming will be based, not upon what one sees, but upon elements that have already been introduced into discourse by structure. It is a matter of constructing a secondary language based upon that primary, but certain and universal, language. But a major difficulty appears immediately. In order to establish the identities and differences existing between all natural entities, it would be necessary to take into account every feature that might have been listed in a given description. Such an endless task would push the advent of natural history back into an inaccessible never-never land, unless there existed techniques that would avoid this difficulty and limit the labour of making so many comparisons. It is possible, *a priori*, to state that these techniques are of two types. Either that of making total comparisons, but only within empirically constituted groups in which the number of resemblances is manifestly so high that the enumeration of the differences will not take long to complete; and in this way, step by step, the establishment of all identities and distinctions can be guaranteed. Or that of selecting a finite and relatively limited group of characteristics, whose variations and constants may be studied in any individual entity that presents itself. This last procedure was termed the System, the first the Method. They are usually contrasted, in the same way as Linnaeus is contrasted with Buffon, Adanson, or Antoine-Laurent de Jussieu – or as a rigid and simple conception of nature is contrasted with the detailed and immediate perception of its relations, or as the idea of a motionless nature is contrasted with that of a teeming continuity of beings all communicating with one another, mingling with one another, and perhaps being transformed into one another. . . . And yet the essential does not lie in this conflict between the great intuitions of nature. It lies rather in the network of necessity which at this point rendered the choice between two ways of constituting

natural history as a language both possible and indispensable. The rest is merely a logical and inevitable consequence.

From the elements that the *System* juxtaposes in great detail by means of description, it selects a particular few. These define the privileged and, in fact, exclusive structure in relation to which identities or differences as a whole are to be examined. Any difference not related to one of these elements will be considered irrelevant. If, like Linnaeus, one selects as the characteristic elements 'all the different parts related to fructification'[17], then a difference of leaf or stem or root or petiole must be systematically ignored. Similarly, any identity not occurring in one of these selected elements will have no value in the definition of the character. On the other hand, when these elements are similar in two individuals they receive a common denomination. The structure selected to be the locus of pertinent identities and differences is what is termed the *character*. According to Linnaeus, the character should be composed of 'the most careful description of the fructification of the first species. All the other species of the genus are compared with the first, all discordant notes being eliminated; finally, after this process, the character emerges'[18].

The system is arbitrary in its basis, since it deliberately ignores all differences and all identities not related to the selected structure. But there is no law that says that it will not be possible to arrive one day, through a use of this technique, at the discovery of a natural system – one in which all the differences in the character would correspond to differences of the same value in the plant's general structure; and in which, inversely, all the individuals or all the species grouped together under a common character would in fact have the same relation of resemblance in all and each of their parts. But one cannot find the way to this natural system unless one has first established with certainty an artificial system, at least in certain of the vegetable or animal domains. This is why Linnaeus does not seek to establish a natural system immediately, 'before a complete knowledge has been attained of everything that is relevant'[19] to his system. It is true that the natural method constitutes 'the first and last wish of botanists', and that all its 'fragments should be searched for with the greatest care'[20], as Linnaeus himself searches for them in his *Classes Plantarum*; but until this natural method appears in its certain and finished form, 'artificial systems are absolutely necessary'[21].

Moreover, the system is relative: it is able to function according to a desired degree of precision. If the selected character is composed of a large structure, having a large number of variables, then as soon as one

passes from one individual to another, even if it is immediately adjacent, the differences will appear at once: the character in this case is very close to pure description[22]. If, on the other hand, the selected structure is limited in extent, and its variables few, then the differences will be rare and the individuals grouped in compact masses. The character is chosen according to the degree of detail required in the classification. In order to establish genera, Tournefort chose the combination of flower and fruit as his character. Not, as with Cesalpino, because these were the most useful parts of the plant, but because they permitted a numerically satisfying combinability: the elements that would be taken from the other three parts (roots, stems, and leaves) were, in effect, either too numerous if treated together or too few if taken separately[23]. Linnaeus calculated that the thirty-eight organs of reproduction, each comprising the four variables of number, form, situation, and proportion, would produce 5,776 configurations, or sufficient to define the genera[24]. If one wishes to obtain groups more numerous than genera, then one must make use of more limited characters ('factitious characters agreed upon between botanists'), as, for example, the stamens alone, or the pistil alone. In this way one would be able to distinguish classes or orders[25].

In this way, a grid can be laid out over the entire vegetable or animal kingdom. Each group can be given a name. With the result that any species, without having to be described, can be designated with the greatest accuracy by means of the names of the different groups in which it is included. Its complete name will cross the entire network of characters that one has established, right up to the largest classifications of all. But for convenience, as Linnaeus points out, part of this name should remain 'silent' (one does not name the class and order), while the other part should be 'sounded' (one must name the genus, the species, and the variety[26]. The plant thus recognized in its essential character and designated upon that basis will express at the same time that which accurately designates it and the relation linking it to those plants that resemble it and belong to the same genus (and thus to the same family and the same order). It will have been given at the same time its proper name and the whole series of common names (manifest or hidden) in which it resides. 'The generic name is, as it were, the official currency of our botanical republic'[27]. Natural history will have accomplished its fundamental task, which is that of 'arrangement and designation'[28].

The *Method* is another technique for resolving the same problem. Instead of selecting, from the totality described, the elements – whether

few or numerous – that are to be used as characters, the method consists in deducing them stage by stage. Deduction is to be taken here in the sense of subtraction. One begins – as Adanson did in his examination of the plants of Senegal[29] – with a species either arbitrarily chosen or encountered by chance. One describes it in its entirety, leaving out none of its parts and determining all the values that the variables have derived from it. This process is repeated with the next species, also given by the arbitrary nature of representation; the description should be as total as in the first instance, but with the one difference that nothing that has been mentioned in the first description should be repeated in the second. Only the differences are listed. And similarly with the third species in relation to the first two, and so on indefinitely. So that, at the very end, all the different features of all the plants have been listed once, but never more than once. And by arranging the later and progressively more sparse descriptions around the earlier ones, we shall be able to perceive, through the original chaos, the emergence of the general table of relations. The character that distinguishes each species or each genus is the only feature picked out from the background of tacit identities. Indeed, such a technique would probably be the most reliable, only the number of existing species is so great that it would be impossible to deal with them all. Nevertheless, the examination of such species as we do meet with reveals the existence of great 'families', of very broad groups in which the species and the genera have a considerable number of identities. So considerable, indeed, that they signalize themselves by a very large number of characteristics, even to the least analytic eye; the resemblance between all the species of Ranunculus, or between all the species of Aconite, is immediately apparent to the senses. At this point, in order to prevent the task becoming infinite, one is obliged to reverse the process. One admits the existence of the great families that are manifestly recognizable, and whose general features have been defined, as it were blindfold, by the first descriptions of them. These are the common features that we now establish in a positive way; then, whenever we meet with a genus or species that is manifestly contained by them, it will suffice to indicate what difference distinguishes it from the others that serve it as a sort of natural entourage. A knowledge of each species can be acquired easily upon the basis of this general characterization: 'We shall divide each of the three kingdoms into several families which will group together all those beings that are strikingly related, and we shall review all the general and particular characters of the beings contained within those families'; in this way

> we shall be assured of relating all these beings to their natural families; and thus, beginning with the ferret and the wolf, the dog and the bear, we shall come to know sufficient about the lion, the tiger, and the hyena, which are animals of the same family[30].

It is immediately apparent in what way the method and the system are opposed. There can be only one method; but one can invent and apply a considerable number of systems: Adanson alone set out sixty-five[31]. The system is arbitrary throughout its development, but once the system of variables – the character – has been defined at the outset, it is no longer possible to modify it, to add or subtract even one element. The method is imposed from without, by the total resemblances that relate things together; it immediately transcribes perception into discourse; it remains, in its point of departure, very close to description; but it is always possible to apply to the general character it has defined empirically such modifications as may be imposed: a feature one had thought essential to a whole group of plants or animals may very well prove to be no more than a particularity of a few of them, if one discovers others that, without possessing that feature, belong quite obviously to the same family; the method must always be ready to rectify itself. As Adanson says, the system is like 'the trial and error method in mathematics': it is the result of a decision, but it must be absolutely coherent; the method, on the other hand, is

> a given arrangement of objects or facts grouped together according to certain given conventions or resemblances, which one expresses by a general notion applicable to all those objects, without, however, regarding that fundamental notion or principle as absolute or invariable, or as so general that it cannot suffer any exception . . . The method differs from the system only in the idea that the author attaches to his principles, regarding them as variables in the method and as absolutes in the system[32].

Moreover, the system can recognize only relations of coordination between animal or vegetable structures. Since the character is selected, not on account of its functional importance but on account of its combinative efficacity, there is no proof that in the internal hierarchy of any individual plant such and such a form of pistil or arrangement of stamens necessarily entails such and such a structure: if the germ of the Adoxa is placed between the calyx and the corolla, or if, in the arum, the stamens

are arranged between the pistils, these are nothing more or less than 'singular structures'[33]; their slight importance is a product of their rarity alone, whereas the equal division of calyx and corolla derives its value only from its frequency[34]. The method, on the other hand, because it proceeds from identities and differences of the most general kind to those that are less so, is capable of bringing out vertical relations of subordination. It enables us, in fact, to see which characters are important enough never to be negated within a given family. In relation to the system, the reversal is very important: the most essential characters make it possible to distinguish the largest and most visibly distinct families, whereas, for Tournefort or Linnaeus, the essential character defined the genus; and it was sufficient for the naturalists' 'agreement' to select a factitious character that would distinguish between classes or orders. In the method, general organization and its internal dependencies are more important than the lateral application of a constant apparatus of variables.

Despite these differences, both system and method rest upon the same epistemological base. It can be defined briefly by saying that, in Classical terms, a knowledge of empirical individuals can be acquired only from the continuous, ordered, and universal tabulation of all possible differences. In the sixteenth century, the identity of plants or animals was assured by the positive mark (sometimes hidden, often visible) which they all bore: what distinguished the various species of birds, for instance, was not the differences that existed *between* them but the fact that this one hunted its food at night, that another lived on the water, that yet another fed on living flesh[35]. Every being bore a mark, and the species was measured by the extent of a common emblem. So that each species identified itself by itself, expressed its individuality independently of all the others: it would have been perfectly possible for all those others not to exist, since the criteria of definition would not thereby have been modified for those that remained visible. But, from the seventeenth century, there can no longer be any signs except in the analysis of representations according to identities and differences. That is, all designation must be accomplished by means of a certain relation to all other possible designations. To know what properly appertains to one individual is to have before one the classification – or the possibility of classifying – all others. Identity and what marks it are defined by the differences that remain. An animal or a plant is not what is indicated – or betrayed – by the stigma that is to be found imprinted upon it; it is what the others are not; it exists in itself only in so far as it is bounded by what is distinguishable from it. Method and system are simply two ways of defining identities by means of the general grid of differences. Later on, beginning with Cuvier, the identity of species was to be determined in the same way by a set of differences, but the differences were in this case to emerge from the background of the great organic unities possessing their own internal systems of dependencies (skeleton, respiration, circulation); the invertebrates were to be defined, not only by their lack of vertebrae, but also by a certain mode of respiration, by the existence of a type of circulation, and by a whole organic cohesiveness outlining a positive unity. The internal laws of the organism were to replace differential characters as the object of the natural sciences. Classification, as a fundamental and constituent problem of natural history, took up its position historically, and in a necessary fashion, between a theory of the *mark* and a theory of the *organism*.

V CONTINUITY AND CATASTROPHE

At the heart of this well-constructed language that natural history has become, one problem remains. It is possible after all that the transformation of structure into character may never be possible, and that the common noun may never be able to emerge from the proper noun. Who can guarantee that the descriptions, once made, are not going to display elements that vary so much from one individual to the next, or from one species to the next, that any attempt to use them as the basis for a common noun would be doomed in advance? Who can be certain that each structure is not strictly isolated from every other structure, and that it will not function as an individual mark? In order that the simplest character can become apparent, it is essential that at least one element in the structure examined first should be repeated in another. For the general order of differences that makes it possible to establish the arrangement of species implies a certain number of similarities. The problem here is isomorphic with the one we have already met in relation to language[36]: for a common noun to be possible, there had to be an immediate resemblance between things that permitted the signifying elements to move along the representations, to slide across the surface of them, to cling to their similarities and thus, finally, to form collective designations. But in order to outline this rhetorical space in which nouns gradually took on their general value, there was no need to determine the status of that resemblance, or whether it was founded upon truth; it was sufficient for

it to strike the imagination with sufficient force. In natural history, however, which is a well-constructed language, these analogies of the imagination cannot have the value of guarantees; and since natural history is threatened, like all language, by the radical doubt that Hume brought to bear upon the necessity for repetition in experience, it must find a way of avoiding that threat. There must be continuity in nature.

This requirement that nature should be continuous does not take exactly the same form in the systems as it does in the methods. For the systematician, continuity consists only of the unbroken juxtaposition of the different regions that can be clearly distinguished by means of characters; all that is required is an uninterrupted gradation of the values that the structure selected as a character can assume in the species as a whole; starting from this principle, it will become apparent that all these values are occupied by real beings, even though they may not yet be known. 'The system indicates the plants, even those it has not mentioned; which is something that the enumeration of a catalogue can never do'[37]. And the categories will not simply be arbitrary conventions laid out over this continuity of juxtaposition; they will correspond (if they have been properly established) to areas that have a *distinct* existence on this *uninterrupted* surface of nature; they will be areas that are larger than individuals but just as real. In this way, according to Linnaeus, the reproductive system made it possible to establish the existence of indisputably well-founded genera: 'Know that it is not the character that constitutes the genus, but the genus that constitutes the character, that the character derives from the genus, not the genus from the character'[38]. In the methods, on the other hand, since resemblances – in their massive and clearly evident form – are posited to start with, the continuity of nature will not be this purely negative postulate (no blank spaces between distinct categories), but a positive requirement: all nature forms one great fabric in which beings resemble one another from one to the next, in which adjacent individuals are infinitely similar to each other; so that any dividing-line that indicates, not the minute difference of the individual, but broader categories, is always unreal. There is a continuity produced by fusion in which all generality is nominal. Our general ideas, says Buffon,

> are relative to a continuous scale of objects of which we can clearly perceive only the middle rungs and whose extremities increasingly flee from and escape our considerations . . . The more we increase the

> number of divisions in the productions of nature, the closer we shall approach to the true, since nothing really exists in nature except individuals, and since genera, orders, and classes exist only in our imagination[39].

And Bonnet, meaning much the same thing, said:

> There are no leaps in nature: everything in it is graduated, shaded. If there were an empty space between any two beings, what reason would there be for proceeding from the one to the other? There is thus no being above and below which there are not other beings that are united to it by some characters and separated from it by others.

It is therefore always possible to discover 'intermediate productions', such as the polyp between the animal and the vegetable, the flying squirrel between the bird and the quadruped, the monkey between the quadruped and man. Consequently, our divisions into species and classes 'are purely nominal'; they represent no more than 'means relative to our needs and to the limitations of our knowledge'[40].

In the eighteenth century, the continuity of nature is a requirement of all natural history, that is, of any effort to establish an order in nature and to discover general categories within it, whether they be real and prescribed by obvious distinctions or a matter of convenience and quite simply a pattern produced by our imagination. Only continuity can guarantee that nature repeats itself and that structure can, in consequence, become character. But this requirement immediately becomes a double one. For if it were given to experience, in its uninterrupted momentum, to traverse exactly, step by step, the great continuity comprising individuals, varieties, species, genera, and classes, there would be no need to constitute a science; descriptive designations would attain to generality quite freely, and the language of things would be constituted as scientific discourse by its own spontaneous momentum. The identities of nature would be presented to the imagination as though spelled out letter by letter, and the spontaneous shift of words within their rhetorical space would reproduce, with perfect exactitude, the identity of beings with their increasing generality. Natural history would become useless, or rather it would already have been written by man's everyday language; general grammar would at the same time be the universal *taxonomy* of beings. But if a natural history perfectly distinct from the analysis of words is indispensable, that is because experience does not reveal the

continuity of nature as such, but gives it to us both broken up – since there are a great many gaps in the series of values effectively occupied by the variables (there are possible creatures whose place in the grid one can note without ever having had the opportunity to observe them) – and blurred, since the real, geographic and terrestrial space in which we find ourselves confronts us with creatures that are interwoven with one another, in an order which, in relation to the great network of *taxonomies*, is nothing more than chance, disorder, or turbulence. Linnaeus pointed out that, by associating the hydra (which is an animal) and the conferva (which is an alga), or the sponge and the coral, in the same localities, nature is not, as the order of our classifications would have it, linking together 'the most perfect plants with the animals termed very imperfect, but combining imperfect animals with imperfect plants'[41]. And Adanson remarked that nature is

> a confused mingling of beings that seem to have been brought together by chance: here, gold is mixed with another metal, with stone, with earth; there, the violet grows side by side with an oak. Among these plants, too, wander the quadruped, the reptile, and the insect; the fishes are confused, one might say, with the aqueous element in which they swim, and with the plants that grow in the depths of the waters . . . This mixture is indeed so general and so multifarious that it appears to be one of nature's laws[42].

Now, this great mixture is the result of a chronological series of events. And these events have their point of origin and their primary locus of application, not in the living species themselves, but in the space in which those species reside. They are produced in the relation of the Earth to the Sun, in climatic conditions, in the movements of the earth's crust; what they affect first are the oceans and the continents, the surface of the globe; living beings are affected only indirectly and in a secondary way: they are attracted or driven away by heat; volcanoes destroy them; they disappear with the land that crumbles away beneath them. It is possible, as Buffon, for example, supposed[43], that the earth was originally incandescent, before gradually growing colder; the animals, accustomed to living in very high temperatures, then regrouped themselves in the only region that still remains torrid, whereas the temperate or cold lands were peopled by species that had not had the opportunity to appear until that time. With the revolutions in the history of the earth, the taxonomic area (in which adjacencies are of the order of *character* and not of *modus vivendi*) was

divided up into a concrete and geographical area that jumbled it all up. Moreover, it was probably broken up into fragments, and many species, adjacent to those we know or intermediary between taxonomic squares familiar to us, must have disappeared, leaving nothing behind them but traces difficult to decipher. In any case, this historical series of events is an addition to the expanse of beings: it does not properly appertain to it; its development lies in the real dimension of the world, not the analytic one of classifications; what it calls into question is the world as a locus for beings, not the beings themselves in so far as they have the property of being alive. There is a historicity, symbolized by the biblical accounts, which affects our astronomic system directly and the taxonomic grid of species indirectly; and apart from Genesis and the Flood, it is very possible that

> our globe underwent other revolutions that have not been revealed to us. It is connected to the whole astronomic system, and the links that join this globe to the other celestial bodies, in particular to the Sun and the comets, could have been the source of many revolutions that have left no traces perceptible to us, but of which the inhabitants of neighbouring worlds may perhaps have some knowledge[44].

To be able to exist as a science, natural history must, then, presuppose two groupings. One of them is constituted by the continuous network of beings; this continuity may take various spatial forms; Charles Bonnet thinks of it sometimes as a great linear scale of which one extremity is very simple, the other very complicated, with a narrow intermediary region – the only one that is visible to us – in the centre; sometimes as a central trunk from which there is a branch forking out on one side (that of the shellfish, with the crabs and crayfish as supplementary ramifications) and the series of insects on the other, branching out to include the frogs[45]; Buffon defines this same continuity 'as a wide woven strip, or rather a bundle which every so often puts out side branches that join it up with the bundles of another order'[46]; Pallas sees it as a polyhedric figure[47]; Hermann wished to constitute a three-dimensional model composed of threads all starting from a common point of origin, separating from one another, 'spreading out through a very great number of lateral branches', then coming together again[48]. The series of events, however, is quite distinct from these spatial configurations, each of which describes the taxonomic continuity in its own way; the series of events is discontinuous, and different in each of its episodes; but, as a whole, it can

be drawn only as a simple line, which is that of time itself (and which can be conceived as straight, broken, or circular). In its concrete form, and in the depth that is proper to it, nature resides wholly between the fabric of the *taxinomia* and the line of revolutions. The tabulations that it forms in the eyes of men, and that it is the task of the discourse of science to traverse, are the fragments of the great surface of living species that are apparent according to the way it has been patterned, burst open, and frozen, between two temporal revolutions.

It will be seen how superficial it is to oppose, as two different opinions confronting one another in their fundamental options, a 'fixism' that is content to classify the beings of nature in a permanent tabulation, and a sort of 'evolutionism' that is supposed to believe in an immemorial history of nature and in a deep-rooted, onward urge of all beings throughout its continuity. The solidity, without gaps, of a network of species and genera, and the series of events that have blurred that network, both belong, at the same level, to the epistemological foundation that made a body of knowledge like natural history possible in the Classical age. They are not two ways of perceiving nature, radically opposed because deeply rooted in philosophical choices older and more fundamental than any science; they are two simultaneous requirements in the archaeological network that defines the knowledge of nature in the Classical age. But these two requirements are complementary, and therefore irreducible. The temporal series cannot be integrated into the gradation of beings. The eras of nature do not prescribe the internal *time* of beings and their continuity; they dictate the *intemperate* interruptions that have constantly dispersed them, destroyed them, mingled them, separated them, and interwoven them. There is not and cannot be even the suspicion of an evolutionism or a transformism in Classical thought; for time is never conceived as a principle of development for living beings in their internal organization; it is perceived only as the possible bearer of a revolution in the external space in which they live.

end here

VI MONSTERS AND FOSSILS

It will be objected that, long before Lamarck, there already existed a whole body of thought of the evolutionist type. That its importance was considerable in the middle of the eighteenth century, and up to the sudden halt marked by the work of Cuvier. That Bonnet, Maupertuis, Diderot, Robinet, and Benoît de Maillet all very clearly articulated the idea that

living forms may pass from one into another, that the present species are no doubt the result of former transformations, and that the whole of the living world is perhaps in motion towards a future point, so that one cannot guarantee of any living form that it has been definitively acquired and is now stabilized forever. In fact, such analyses are incompatible with what we understand today by evolutionary thought. They are concerned, in fact, with linking the table of identities and differences to the series of successive events. And in order to conceive of the unity of that table and that series they have only two means at their disposal.

The first consists in integrating the series of successions with the continuity of the beings and their distribution over the table. All the creatures that taxonomy has arranged in an uninterrupted simultaneity are then subjected to time. Not in the sense that the temporal series would give rise to a multiplicity of species that a horizontally oriented eye could then arrange according to the requirements of a classifying grid, but in the sense that all the points of the taxonomy are affected by a temporal index, with the result that 'evolution' is nothing more than the interdependent and general displacement of the whole scale from the first of its elements to the last. This system is that of Charles Bonnet. He implies in the first place that the chain of being, stretching up through an innumerable series of links towards the perfection of God, does not at present attain to it [49]; that the distance between God and the least defective of his creatures is still infinite; and that across this, perhaps unbridgeable, distance the whole uninterrupted fabric of beings is ceaselessly advancing towards a greater perfection. He implies further that this 'evolution' keeps intact the relation that exists between the different species: if one of them, in the process of perfecting itself, should attain the degree of complexity possessed beforehand by the species one step higher, this does not mean that the latter has thereby been overtaken, because, carried onward by the same momentum, it cannot avoid perfecting itself to an equivalent degree:

> There will be a continual and more or less slow progress of all the species towards a superior perfection, with the result that all the degrees of the scale will be continually variable within a determined and constant relation . . . Man, once transported to an abode more suited to the eminence of his faculties, will leave to the monkey and the elephant that foremost place that he occupied before among the animals of our planet . . . There will be Newtons among the monkeys and Vaubans

where what mattered was resemblance, the strength of the imagination, nature and human nature, and the value of general and abstract ideas – in short, the relations between the perception of similitude and the validity of the concept. In the Classical age – Locke and Linnaeus, Buffon and Hume are our evidence of this – the critical question concerned the basis for resemblance and the existence of the genus.

In the late eighteenth century, a new configuration was to appear that would definitively blur the old space of natural history for modern eyes. On the one hand, we see criticism displacing itself and detaching itself from the ground where it had first arisen. Whereas Hume made the problem of causality one case in the general interrogation of resemblances[65], Kant, by isolating causality, reverses the question; whereas before it was a question of establishing relations of identity or difference against the continuous background of similitudes, Kant brings into prominence the inverse problem of the synthesis of the diverse. This simultaneously transfers the critical question from the concept to the judgement, from the existence of the genus (obtained by the analysis of representations) to the possibility of linking representations together, from the right to name to the basis for attribution, from nominal articulation to the proposition itself, and to the verb *to be* that establishes it. Whereupon it becomes absolutely generalized. Instead of having validity solely when applied to the relations of nature and human nature, it questions the very possibility of all knowledge.

On the other hand, however, and during the same period, life assumes its autonomy in relation to the concepts of classification. It escapes from that critical relation which, in the eighteenth century, was constitutive of the knowledge of nature. It escapes – which means two things: life becomes one object of knowledge among others, and is answerable, in this respect, to all criticism in general; but it also resists this critical jurisdiction, which it takes over on its own account and brings to bear, in its own name, on all possible knowledge. So that throughout the nineteenth century, from Kant to Dilthey and to Bergson, critical forms of thought and philosophies of life find themselves in a position of reciprocal borrowing and contestation.

NOTES

[1] J. Ray published a *Historia plantarum generalis* as late as 1686.

[2] Jonston, *Historia naturalis de quadripedidus* (Amsterdam, 1657, pp. 1–11).

[3] Diderot, *Lettre sur les aveugles*. Cf. Linnaeus: 'We should reject . . . all

accidental notes that do not exist in the Plant either for the eye or for the touch' (*Philosophie botanique*, section 258).

[4] Linnaeus, *Systema naturae*, p. 214. On the limited usefulness of the microscope, cf. ibid, pp. 220–1. (We have retained throughout the author's references to the French editions of the works of Linné (Linnaeus) – translator's note.)

[5] Tournefort, *Isagoge in rem herbariam* (1719); Fr. trans. in Becker-Tournefort (Paris, 1956, p. 295). Buffon criticized the Linnaean method for relying upon characters so tenuous that it rendered the use of the microscope unavoidable. From one naturalist to another, reproof concerning the use of an optical instrument has value as a theoretical objection.

[6] Linnaeus, *Philosophie botanique*, section 299.

[7] Ibid., section 167; cf. also section 327.

[8] Tournefort, *Éléments de botanique*, p. 558.

[9] Linnaeus, *Philosophie botanique*, section 299.

[10] Linnaeus (op. cit., section 331) lists the parts of the body that can be used as archetypes, whether for dimensions or, above all, for forms: hair, nails, thumbs, palms, eyes, ears, fingers, navel, penis, vulva, breasts.

[11] Ibid., sections 328–9.

[12] Buffon, *Discours sur la manière de traiter l'histoire naturelle* (*Œuvres complètes*, t. I, p. 21).

[13] Adanson, *Familles des plantes* (Paris, 1763, t. I, préface, p. cci).

[14] Boissier de Sauvages, *Nosologie méthodique* (Fr. trans. Lyon, 1772, t. I, pp. 91–2).

[15] Linnaeus, *Philosophie botanique*, section 258.

[16] Tournefort, *Éléments de botanique*, pp. 1–2.

[17] Linnaeus, *Philosophie botanique*, section 192.

[18] Ibid., section 193.

[19] Linnaeus, *Systema naturae*, section 12.

[20] Linnaeus, *Philosophie botanique*, section 77.

[21] Linnaeus, *Systema naturae*, section 12.

[22] 'The natural character of the species is its description' (Linnaeus, *Philosophie botanique*, section 193).

[23] Tournefort, *Éléments de botanique*, p. 27.

[24] Linnaeus, *Philosophie botanique*, section 167.

[25] Linnaeus, *Système sexuel des végétaux* (Fr. trans. Paris, year VI, p. 21).

[26] Linnaeus, *Philosophie botanique*, section 212.

[27] Ibid., section 284.

[28] Ibid., section 151. These two functions, which are guaranteed by the character, correspond exactly to the functions of designation and derivation performed in language by the common noun.

[29] Adanson, *Histoire naturelle du Sénégal* (Paris, 1757).

[30] Adanson, *Cours d'histoire naturelle* (Paris, 1772; 1845 edn., p. 17).
[31] Adanson, *Familles des plantes*.
[32] Ibid., t. I, préface.
[33] Linnaeus, *Philosophie botanique*, section 105.
[34] Ibid., section 94.
[35] Cf. P. Belon, *Histoire de la nature des oiseaux*.
[36] Cf. p. 113 above.
[37] Linnaeus, *Philosophie botanique*, section 156.
[38] Ibid., section 169.
[39] Buffon, *Discours sur la manière de traiter l'histoire naturelle* (*Œuvres complètes*, t. I, pp. 36 and 39).
[40] C. Bonnet, *Contemplation de la nature*, Ière partie (*Œuvres complètes*, t. IV, pp. 35–6).
[41] Linnaeus, *Philosophie botanique*.
[42] Adanson, *Cours d'histoire naturelle*, 1845 edn., pp. 4–5.
[43] Buffon, *Histoire de la terre*.
[44] C. Bonnet, *Palingénésie philosophique* (*Œuvres complètes*, t. VII, p. 122).
[45] C. Bonnet, *Contemplation de la nature*, chap. XX, pp. 130–8.
[46] Buffon, *Histoire naturelle des oiseaux* (1770, t. I, p. 396).
[47] Pallas, *Elenchus Zoophytorum* (1786).
[48] J. Hermann, *Tabulae affinitatum animalium* (Strasbourg, 1783, p. 24).
[49] C. Bonnet, *Contemplation de la nature*, Ière partie (*Œuvres complètes*, t. IV, p. 34 *et seq.*).
[50] C. Bonnet, *Palingénésie philosophique* (*Œuvres complètes*, t. VII, pp. 149–150).
[51] C. Bonnet (*Œuvres complètes*, t. III, p. 173) quotes a letter from Leibniz to Hermann on the chain of being.
[52] C. Bonnet, *Palingénésie philosophique* (*Œuvres complètes*, t. VII, p. 193).
[53] Benoît de Maillet, *Telliamed ou les entretiens d'un philosophe chinois avec un missionnaire français* (Amsterdam, 1748, p. 142).
[54] Maupertuis, *Essai sur la formation des corps organisés* (Berlin, 1754, p. 41).
[55] J-B. Robinet, *De la nature* (3rd edn., 1766, pp. 25–8).
[56] J-B. Robinet, *Considérations philosophiques sur la gradation naturelle des formes de l'être* (Paris, 1768, pp. 4–5).
[57] Ibid., p. 198.
[58] On the non-existence of the biological notion of the 'environment' in the eighteenth century, cf. G. Canguilhem, *La Connaissance de la vie* (Paris, 2nd edn., 1965, pp. 129–54).
[59] J-B. Robinet, *Considérations philosophiques sur la gradation naturelle des formes de l'être*, p. 19.
[60] Linnaeus, *Systema naturae*, p. 13.
[61] Cf., for example, Linnaeus, *Systema naturae*, p. 215.

[62] Linnaeus, *Philosophie botanique*, section 133. Cf. also *Système sexuel des végétaux*, p. 1.
[63] Bonnet accepted a quadripartite division in nature: unstructured brute beings, inanimate structured beings (vegetables), animate structured beings (animals), animate structured and reasoning beings (men). Cf. *Contemplation de la nature*, II ième partie, chap. I.
[64] Linnaeus, *Systema naturae*, p. 215.
[65] Hume, *A treatise of human nature* (1739, book I, part III, section III, and part IV, section VI).