

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and the meticulous observation of living beings was thus born upon the empty strand from which Cartesianism had just withdrawn.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 Structure 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