A dense forest of white-barked trees, possibly birches, with numerous small, realistic human eyes embedded in their trunks. The trees are set against a dark, textured ground. The overall mood is mysterious and surreal.

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FROM
THE TREE
TO THE
LABYRINTH

§

HISTORICAL STUDIES ON THE
SIGN AND INTERPRETATION

UMBERTO ECO

TRANSLATED BY ANTHONY OLDORN

FROM THE TREE TO THE LABYRINTH

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Introduction

At the second congress of the International Association for Semiotic Studies (Vienna, July 1979) I presented a number of “Proposals for a History of Semiotics.” I recommended that we intensify historical studies on the various theories of the sign and of semiosis over the centuries, first of all because I considered it a necessary contribution to the history of philosophy as a whole, and second because I was convinced that to do semiotics today one needed to know how it was done yesterday, however much it might have been disguised as something else. And what better place to begin than from that “Coup d’oeil sur le développement de la sémiotique” with which Roman Jakobson had opened the first international congress of the association five years earlier?

I suggested three lines of research. The first had narrower ambitions, since it was confined to those authors who had spoken explicitly about the relation of signification, starting with the *Cratylus* and with Aristotle, down through Augustine and eventually to Peirce—but without neglecting the authors of treatises on rhetoric like Emanuele Tesauro or the theorists of universal and artificial language like Wilkins or Beck.

My second line of research involved a close rereading of the whole history of philosophy with a view to finding implicit semiotic theories even where they had apparently not been explicitly developed, and the chief example I gave was that of Kant.

Finally, my third suggestion was intended to cover all those forms of literature in which symbolic and hermeneutical strategies of any kind were deployed or developed (among them, for instance, the works of the Pseudo-Areopagite). I cited as examples manuals of divination (texts like Guglielmo Dorando’s *Rationale divinatorum officiorum*), the medieval bestiaries, the various discussions of poetics, down to the marginal notes of writers and artists who had reflected in one way or another on the processes of communication.

Anyone familiar with the bibliography of semiotics over the last thirty years knows that my appeal was anchored on the one hand in already developed or developing historiographical interests, while on the other it voiced an urgency that was already, so to speak, in the air: over the past thirty years, the contributions to an historical reconstruction of theories of the sign and semiosis have been many, so many that we are already in a position (provided someone could be found with the will and the energy to take on the task) to plan a definitive history of semiotic thought, by various authors and in several volumes.

For my own part, in the course of this thirty-year period, I have continued to elaborate the

occasional personal offering, even returning from time to time to a topic previously explored—not mention that chapter in semiotic history to which I devoted my *La ricerca della lingua perfetta* (1993), translated as *The Search for a Perfect Language* (1995). Such, then, is the origin and nature of the essays gathered in the present volume.

They were conceived under various circumstances, some for strictly academic occasions, others discourses addressed to a broader general public. I decided not to attempt to rewrite them in a more uniform style, and I have kept the apparatus of notes and references in the case of the more specialized contributions and the conversational tone in the case of the more essayistic pieces.

I trust that even readers whose interests are not specifically semiotic (in the professional sense of the word) will be able to read these writings as contributions to a history of the various philosophies of language or languages.

1

From the Tree to the Labyrinth

1.1. Dictionary and Encyclopedia

For some time now the notions of dictionary and encyclopedia have been used in semiotic linguistics, the philosophy of language and the cognitive sciences, to say nothing of computer science to identify two models of *semantic representation*, models that in turn refer back to a general representation of knowledge and/or the world.

In defining a term (and its corresponding concept), the *dictionary* model is expected to take into account only those properties *necessary and sufficient* to distinguish that particular concept from others; in other words, it ought to contain only those properties defined by Kant as *analytical* (analytical being that a priori judgment in which the concept functioning as predicate can be deduced from the definition of the subject). Thus the analytical properties of dog would be ANIMAL, MAMMAL, and CANINE (on the basis of which a dog is distinguishable from a cat, and it is logical incorrect and semantically inaccurate to say of something that it is a dog but it is not an animal). The definition does not assign to the dog the properties of barking or being domesticated: these are not necessary properties (because there may be dogs incapable of barking and/or hostile to man) and are not part of our knowledge of a language but of our *knowledge of the world*. They are therefore matters for the *encyclopedia*.

In this sense semiotic dictionaries and encyclopedias are not directly comparable to dictionaries and encyclopedias “in the flesh,” so to speak, to the published products, in other words, that go by the same name. In fact, dictionaries “in the flesh” are not usually composed according to the dictionary model: a normal dictionary, for instance, may define “cat” as a feline mammal, but usually adds details of an encyclopedic nature that concern the cat’s fur, the shape of its eyes, its behavioral habits, and so on and so forth.

If we wish to identify a dictionary in its pure form—to which various contemporary theoreticians in the field of artificial intelligence still refer when they speak (see [section 1.7](#) below) “ontologies”—we must return to the model of the *Arbor Porphyriana* or Porphyrian tree, in other words to the commentary on Aristotle’s *Categories* written in the third century A.D. by the Neoplatonist Porphyry in his *Isagoge*, a text that throughout the Middle Ages (and beyond) will be a constant point of reference for any theory of definition.

1.2. The Dictionary

1.2.1. *The First Idea of the Dictionary: The Arbor Porphyriana*

Aristotle (*Posterior Analytics*, II, iii, 90b 30) says that what is defined is the essence or essential nature. Defining a substance means deciding, among its attributes, which of them appear to be essential, and in particular those that are the cause of the fact that the substance is what it is, in other words, its *substantial form*.

The problem is coming up with the right attributes that can be predicated as elements of the definition (*Posterior Analytics*, II, xiii, 96a–b). Aristotle gives the example of the number 3: an attribute such as being certainly applies to the number 3, but also to anything else that is not a number. On the other hand, the fact of being odd applies to the number 3 in such a way that, even if it has a wider application (it also applies, for instance, to the number 5), it nonetheless does not extend beyond the class of numbers. These are the attributes we must look for “up to the point where, although singular, they have a wider extension of meaning than the subject, collectively they have not; for this must be the essence of the thing” (II, xiii, 96a 35). What Aristotle means is that, if we define man as MORTAL, ANIMAL and RATIONAL, each of these attributes, taken on its own, can also be applied to other beings (horses, for example, are animal and mortal, and the gods, in the Neo-Platonic sense of the word, are animal and rational), but, taken altogether, as a defining “group,” MORTAL RATIONAL ANIMAL applies only to man, and in a way that is absolutely reciprocal.

A definition is not a demonstration: to reveal the essence of a thing is not the same as to prove a proposition about that thing; a definition says *what* something is, whereas a demonstration proves *that* something is (II, iii, 91a 1), and, consequently, in a definition we assume what a demonstration must on the contrary prove (II, 3, 91a 35). Those who define do not prove that something exists (II, iii, 91a 20). This means that for Aristotle a definition is concerned with *meaning* and has nothing to do with processes of *reference* to a state of the world (II, iii, 93b 30).

To find the right way to construct good definitions, Aristotle develops the theory of *predicables*, that is, of the ways in which categories can be predicated of a subject. In his *Topics* (I, iv, 101b 17–20) he identifies only four predicables (genus, proprium or unique property, definition, and accident), while Porphyry—as we shall see—will speak of five predicables (genus, species, difference, proprium, and accident).¹

In a lengthy discussion in the *Posterior Analytics* (II, xiii), Aristotle outlines a series of rules for how to develop a proper division, proceeding from the most universal genera to the *infimae species*, and at each stage identifying at each stage of the division the proper difference.

This is the method followed by Porphyry in the *Isagoge*. The fact that Porphyry develops a theory of division in a commentary on the *Categories* (where the problem of difference is hardly mentioned) is a serious matter for debate (see, for instance, Moody 1935), but it is not particularly relevant to our analysis.

In the same way, we may sidestep the *vexata quaestio* of the nature of universals, a question that Boethius bequeaths to the Middle Ages, taking the *Isagoge* itself as his point of departure. Porphyry declares his intention (we do not know how sincere he is) of setting aside the question of whether

genera and species exist in and of themselves or if they are concepts of the mind. However that may be, he is the first to translate Aristotle in terms of a tree, and it is certainly difficult to avoid the suspicion that, in so doing, he is indebted to the Neo-Platonic notion of the Great Chain of Being.² We may safely ignore, however, the metaphysics that underlies the *Arbor Porphyriana*, given that what interests us is the fact that this tree, whatever its metaphysical roots, is conceived of as a representation of logical relationships.

Porphyry delineates a *single* tree of substances, whereas Aristotle uses the method of division with a great deal of caution and, we might add, a great deal of skepticism. He seems to give it considerable weight in the *Posterior Analytics*, but to be more circumspect in *On the Parts of Animals* (642b seq.), where he gives the impression of being prepared to construct different trees depending on which problem he is dealing with, even when it comes to defining the same species (see the whole discourse on animals with horns, apropos of which see Eco 1983a).

But Porphyry outlined a single tree of substances, and it is through this model, and not the more problematical discussion in the real Aristotle, that the idea of a dictionary structure of definition is transmitted, via Boethius, down to our own day, even though present-day proponents of a dictionary-based semantics may not know to whom they are indebted.

Porphyry, we were saying, lists five predicables: genus, species, difference, proprium, and accident. The five predicables establish the mode of definition for each of the ten categories. It is possible, then, to imagine ten Porphyrian trees: one for substances, which allows us, for example, to define man as MORTAL RATIONAL ANIMAL, and one for each of the other nine categories—a tree of qualities, for example, in which purple is defined as a species of the genus red.³ Therefore there are ten possible trees, but there is no tree of trees because Being is not a *summum genus*.

There can be no doubt that the Porphyrian tree of substances aspires to be a hierarchical and finite whole of genera and species. The definition Porphyry gives of “genus” is purely formal: a genus is that to which a species is subordinate. Conversely, a species is what is subordinate to a genus. Genus and species are mutually definable and therefore complementary. Every genus placed on a high node of the tree includes the species that depend upon it; every species subordinate to a genus is a genus for the species subordinate to it, down to the base of the tree, where the *specie specialissime*, or “second substances,” such as man, for instance, are collocated. At the highest fork is the *genus generalissimum* (represented by the name of the category), which cannot be a species of anything else. A genus can be a *predicate* of its own species, whereas the species *belong* to a genus.

The relationship of species to their superior genera is a relationship of hyponyms to hyperonyms. This phenomenon would guarantee the finite structure of the tree since, granted a given number of *specie specialissime*, and given that for two (or more) species there is only one genus, then, as we proceed upward, in the end the tree inevitably tapers off till it reaches the root node. In this sense the tree would fulfill all the functions required of a good dictionary.

But a Porphyrian tree cannot be made up only of genera and species. If this were the case, it would take the form illustrated in [Figure 1.1](#).

In a tree of this kind man and horse (or man and cat) could not be distinguished from one another. A man is different from a horse because, though both may be animals, the first is rational and the

second isn't. Rationality is the *difference* for man. Difference is the crucial element, because *accidents* are not required to produce a definition.⁴

Differences may be separable from the subject (such as being hot, being in motion, being sick), in which case they are simply "accidents" (things that may happen—from the Latin *accidere* [= happen—to a subject or not happen). But they may also be inseparable: among these some are inseparable but still accidental (like having a snub nose), others belong to the subject in and of itself, or essentially, like being *rational* or *mortal*. These are the *specific* differences and are added to the genus to form the definition of the species.

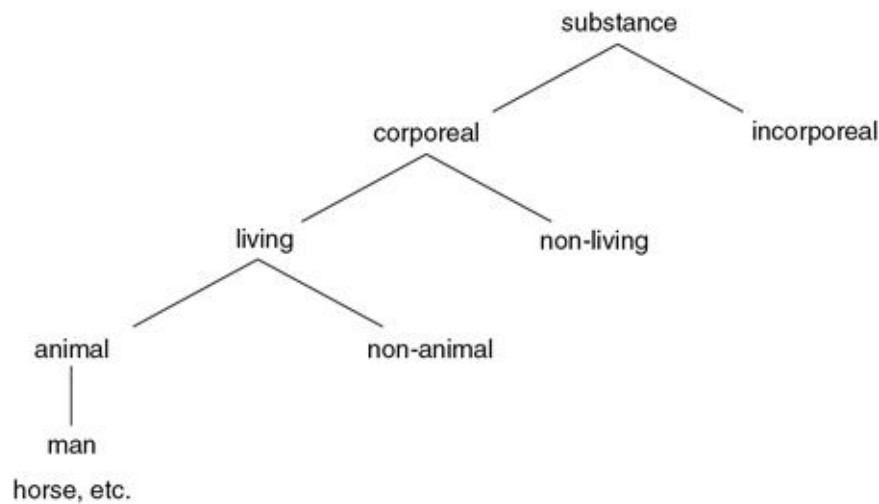


Figure 1.1

Differences may be divisive or constitutive. For example, the genus LIVING BEING is potentially divisible into the differences *sensitive/insensitive*, but the *sensitive* difference may be compounded with the genus LIVING to constitute the species ANIMAL. In its turn ANIMAL becomes a genus divisible into *rational/irrational*, but the *rational* difference is constitutive, with the genus that it divides, of the species RATIONAL ANIMAL. Differences, then, divide a genus (and the genus contains them as potential opposites) and they are selected to constitute in practice a subordinate species, destined to become in its turn a genus divisible into new differences.

The *Isagoge* suggests the idea of the tree only verbally, but medieval tradition visualized the project as seen in [Figure 1.2](#).

In the tree in [Figure 1.2](#) the dotted lines mark the dividing differences, while the solid lines mark the constitutive differences. We remind the reader that the god appears both as an animal and as a body because, in the Platonic theology that constitutes Porphyry's frame of reference, the gods are intermediary natural forces and not to be identified with the One.⁵

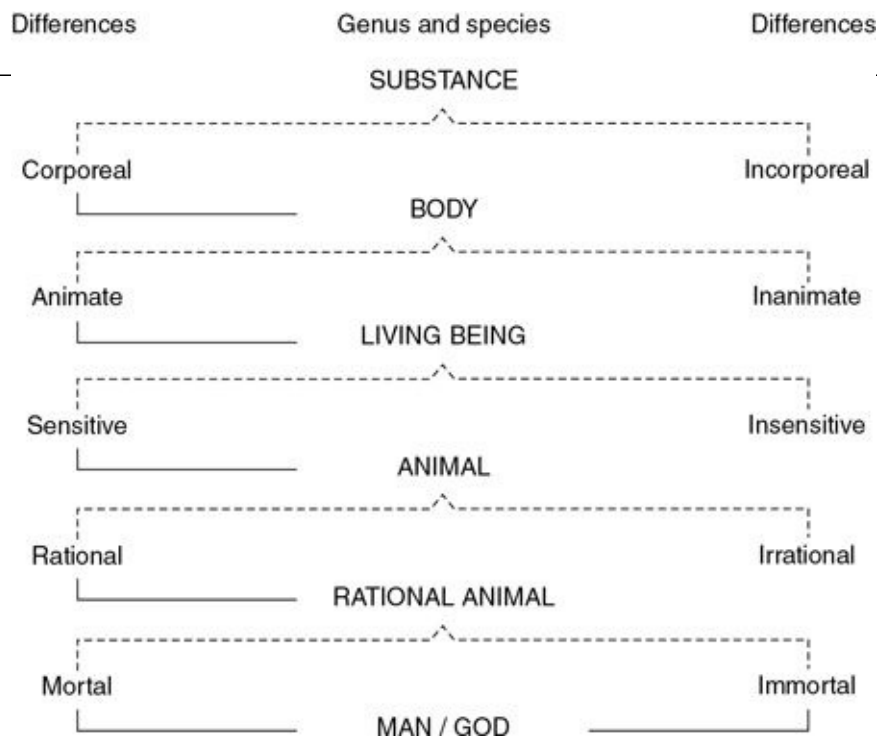
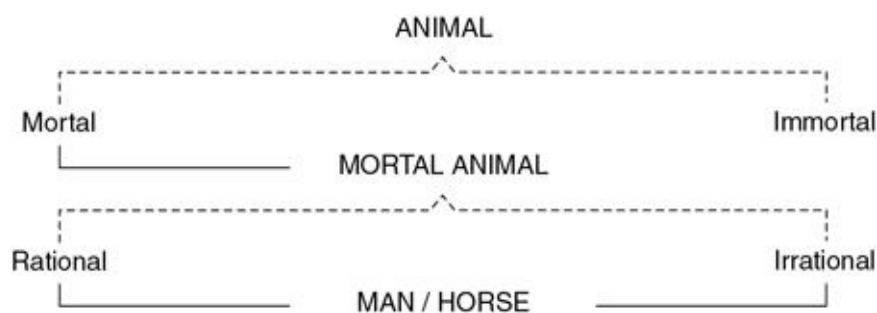


Figure 1.2

From the contemporary point of view of a distinction between dictionary and encyclopedia, the Porphyrian tree certainly introduces, with its differences, encyclopedic properties into a dictionary structure. In fact, being *Sensitive*, *Animate*, *Rational*, and *Mortal* are accidents identifiable in terms of knowledge of the world, and it is on the basis of its behavior that we decide whether a being is animate or rational, whether, in other words, it expresses ratiocinative capabilities by means of language. In any case, the end purposes of the tree are those of a dictionary, in which the differences are necessary and sufficient conditions to distinguish one being from another and to make the *definiens* or definiens coextensive with the *definiendum* or definee, so that, if ANIMAL RATIONAL MORTAL, therefore of necessity *human*, and vice versa.

Once more, however, in its canonical version, this tree reveals its inadequacy, because it distinguishes, in a logically satisfactory fashion, God from man, but not, let's say, a man from a horse. If we had to define the horse, the tree would have to be enriched with further disjunctions: we would need, for example, to divide ANIMALS into *mortal* and *immortal*, and the next species down—that is, MORTAL ANIMALS—into *rational* (men) and *irrational* (horses, for instance), even though unfortunately, this subdivision, as is apparent in Figure 1.3, would not allow us to distinguish horses from donkeys, cats, or dogs.



Even if we were willing to pay this price, however, we still could not reintroduce God into the tree. The only solution would be to insert the same difference twice (at least) under two different genera (Figure 1.4).

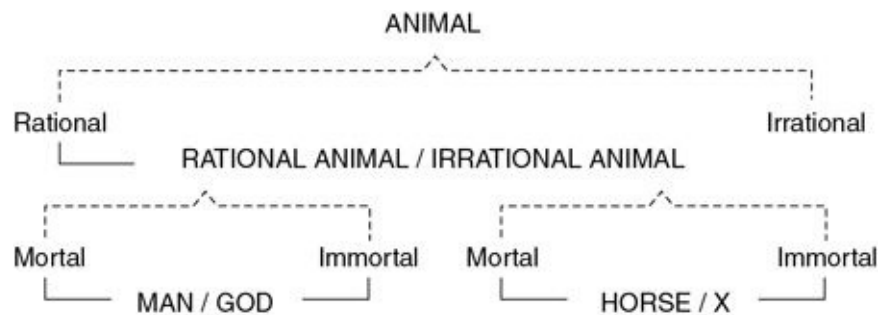


Figure 1.4

Porphyry would not have discouraged this decision, given that he himself says (18.20) that the same difference “can often be observed in different species, such as having four legs in many animals that belong to different species.”⁶

Aristotle too said that when two or more genera are subordinate to a superior genus (as occurs in the case of the man and the horse, insofar as they are both animals), there is nothing to prevent them having the same differences (*Categories* 1b 15 et seq.; *Topics* VI, 164b 10). In the *Posterior Analytics* (II, 90b et seq.), Aristotle demonstrates how one can arrive at an unambiguous definition of the number 3. Given that the number 1 was not a number for the Greeks (but the source and measure of all the other numbers), 3 could be defined as that odd number that is prime in both senses (that is, neither the sum nor the product of other numbers). This definition is fully reciprocable with the expression *three*. But it is interesting to reconstruct in Figure 1.5 the process of division by which Aristotle arrives at this definition.

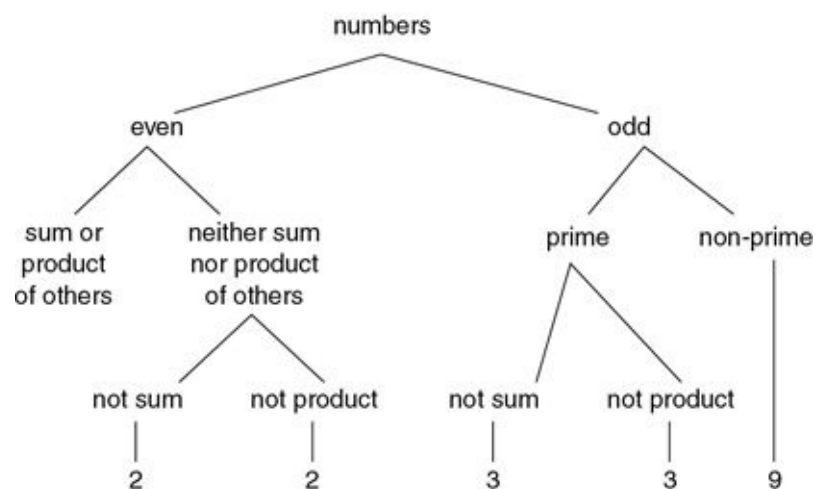


Figure 1.5

This type of division shows how properties like *not the sum* and *not the product* (which a

differences) are not exclusive to any one disjuncture but can occur under several nodes. The same pair of dividing differences, then, can occur under several genera. Not only that, but the moment a certain difference has proved useful in defining a certain species unambiguously, it is no longer important to consider all the other subjects of which it is equally predicable (which amounts to saying that, once one or more differences have served to define the number 3, it is irrelevant that it may occur in the definition of other numbers).⁷ Once we have said, then, that, given several subordinate genera, nothing prevents them having the same differences, it is difficult to say how many times the same pair of differences can occur.

In his *Topics* too (VI, 6, 144b), Aristotle admitted that the same difference may occur twice under two different genera (as long as they are not subordinate): “the earthbound animal and the flying animal are in fact genera not contained the one within the other, even though the notion of two leggedness is the difference of both.”⁸

If the same difference can recur a number of times, the finiteness and logical purity of the tree—which runs the risk of exploding into a dust cloud of differences, reproduced identically under different genera—are compromised. Indeed, if we reflect that species are a combination of genus and difference, and the genus higher up is in its turn a combination of another genus plus a difference (and therefore genera and species are abstractions, intellectual figments which serve to sum up various organizations of differences or accidents), *the most logical solution would be for the tree to be made up solely of differences*, properties that can be arranged into different trees according to the things to be defined, jettisoning the distinction between substances and accidents.

Many medieval commentators of the *Isagoge* appear to endorse this conclusion. Boethius in his *De divisione* (VI, 7) suggests that substances like pearl, ebony, milk, and some accidents like white and liquid may give rise to alternative trees. In one, for example, given a genus Liquids, with the differences *White/Black*, we would have the two species Milk and Ink; in the other, the genus White Things, with the differences *Liquid/Solid*, would generate the two species of Milk and Pearl (Figure 1.6).

True, in this passage Boethius is speaking only of accidents, but, in *De divisione* XII, 37, he applies the same principle to all divisions of genus (“generis unius fit multiplex divisio” [“a single genus divisible in more than one way”]).⁹

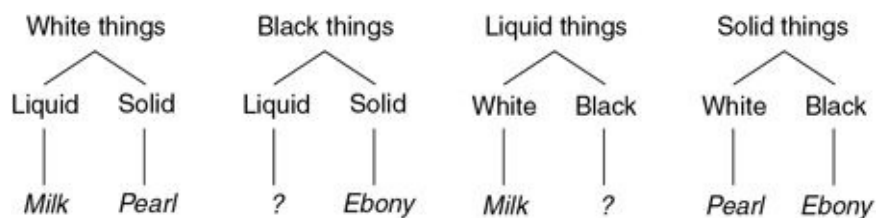


Figure 1.6

Abelard says the same thing in his *Editio super Porphyrium* (150, 12), where he reminds us that “Pluraliter ideo dicit genera, quia animal dividitur per rationale animal et irrationale; et rationale per mortale et immortale dividitur; et mortale per rationale et irrationale dividitur” (“He [Porphyry] refers

then to genera in more than one way, for animal is divisible into rational animal and irrational animal and rational is divisible into mortal and immortal; and mortal is divisible into rational and irrational (Figure 1.7).¹⁰



Figure 1.7

In a tree composed solely of differences, these can be continually reorganized following the description under which a given subject is considered, and the tree thus becomes a structure sensitive to contexts, not an absolute dictionary.

On the other hand, when Aristotle (who is interested in defining accidents as well as substance) asserts (*Posterior Analytics* I, 3, 83a, 15) that definitions must stick to a finite number of determinations, in either an ascending or a descending series, he does not in the least seem to be suggesting that their number and function are already established by a previous categorical structure. In fact in his various researches into natural phenomena, from the eclipse to the definition of ruminants, he shows a great deal of flexibility in setting up subdivisions and suggesting trees in which genera, species, and differences exchange roles according to the problem one intends to resolve.

In *Posterior Analytics* II, 3, 90a, 15, he says that the eclipse is a deprivation of the sun's light by the earth's interposition. In order to define it this way we must suppose a division into genus and species like the one in Figure 1.8.

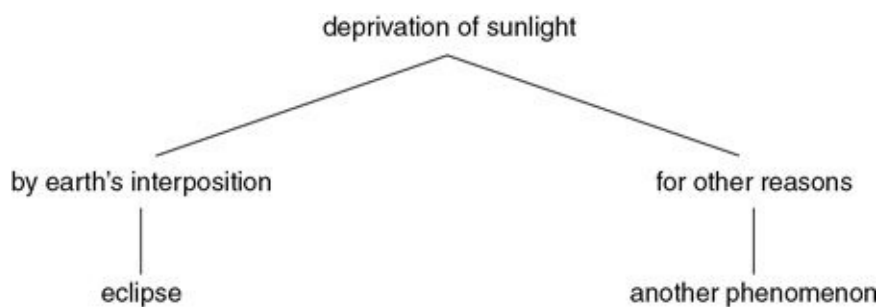


Figure 1.8

But what is the deprivation of the sun's light a species of? Are we talking about a tree that takes cognizance of the various kinds of deprivation (among which, let's say, are the deprivation of food and of life) or a tree that takes cognizance of various astronomical phenomena and opposes the radiation of the sun's light to its deprivation?

In II, 3, 93b, 5, the example of thunder is discussed. It is defined as extinction of fire in the clouds. Hence a tree as in Figure 1.9:

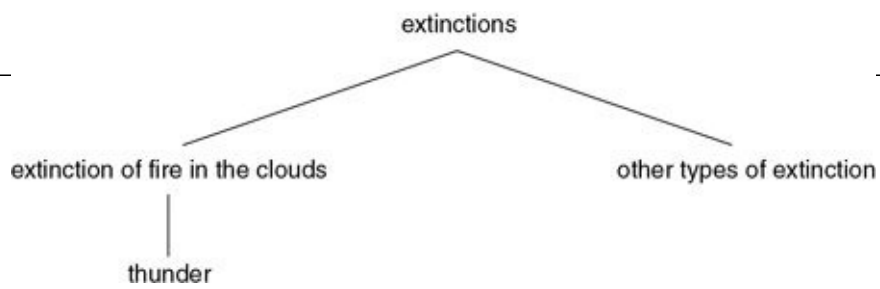


Figure 1.9

But what if the definition had been “noise produced by the extinction of fire in the clouds”? In this case, the tree would have to look like [Figure 1.10](#).

As can be seen, in the first case thunder is a species of the genus extinction, in the second case the genus noises.

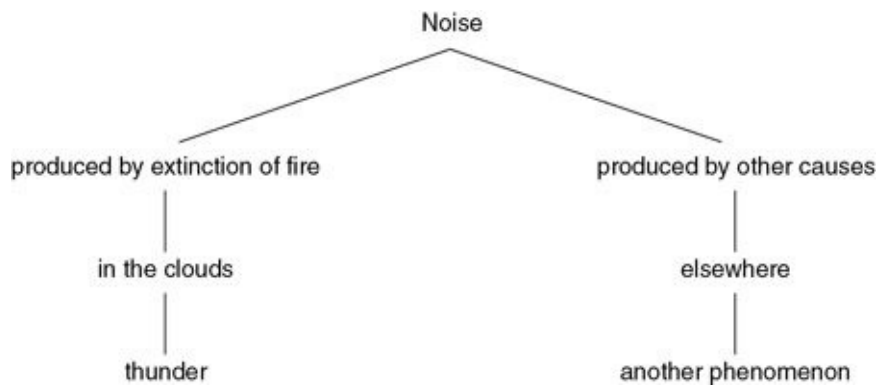


Figure 1.10

This flexibility is due to the fact that, when he is dealing with concrete phenomena, it is the philosopher’s intention *to define them*, while a tree with a fixed hierarchy and a finite number of determinations serves only to *classify*. Merely classificatory, for example, is a device that embeds genera, species, and differences without explaining the nature of the *definiendum*. This model is the basis of the taxonomy of today’s natural sciences, in which it is established, for instance, that a dog belongs to the genus CANIS, of the family of CANINES, of the suborder of FISSIPEDS, of the order CARNIVORES, of the subclass of PLACENTALS, of the class of MAMMALS. This classification, however, does not tell us (and is not meant to tell us) either what the properties of a dog are or how to recognize a dog or refer to a dog. Every node of the classification is in fact a *pointer* that refers to another chapter of zoology in which the properties of Mammals, Placentalia, Carnivores, Fissipedes, and so on are specified.

A dictionary classification, then, does not serve to *define* a term but merely to allow us to use it in a logically correct fashion. Given, let’s say, that the imaginary order of the Pridides is classified as belonging to the genus Prosidides and the Prosidides are a species of the genus Proceidides, we do not need to know what the properties of a proceid or a prosid are to draw (true) inferences along the lines of: *this is a pridid then it has to be a prosid, and it is impossible that something that is a pridid should not be a proceid.*

But these are not the bases which allow us to understand expressions in which terms like *prixid* and *proceid* appear: it is one thing to know that it is logically incorrect to say that a *prixid* is not a *proceid*; it is quite another to say what a *proceid* is, and, if it means anything to say that terms have a meaning, the classification does not supply that meaning.

Gil (1981: 1027) suggests that genera and species may be used as extensional parameters (classes) whereas only the differences decide the intensional regime. This is tantamount to saying that the meaning of a term depends on the differences and not on the genera or the species. Now, what makes it difficult to regiment the differences under a Porphyrian tree is that the differences are accidents, and accidents are infinite or at least indefinite in number.

The differences are qualities (and it is no accident that, while genera and species, which represent substances, are expressed by common nouns, the differences are expressed by adjectives). The differences come from a tree that is not the same as the substances, and their number is not known *a priori* (*Metaphysics* VIII, 1042a–1042b). Granted, Aristotle makes these remarks about nonessential differences, but at this point who can say which differences are essential and which not? Aristotle plays on a few examples (like *rational* and *mortal*), but when he speaks about species other than human, such as animals or artificial objects, he becomes much more vague and the differences multiply.

In theory we are entitled to put forward the hypothesis that Aristotle would not have been capable of constructing a finite Porphyrian tree, but in practice as well (on the basis, that is, of the philological evidence), when we read *On the Parts of Animals*, we see that he gives up *in practice* on constructing a single tree and readjusts complementary trees according to the properties whose cause and essential nature he wishes to explain (cf. Balme 1961 and Eco 1983a).

The notion of specific difference is, rhetorically speaking, an oxymoron. Saying *specific difference* is tantamount to saying *essential accident*. But this oxymoron conceals (or reveals) a far more serious ontological contradiction.

The thinker who understood the problem without prevarication (though he pointed it out with his customary prudence) was Thomas Aquinas. In his *De ente et essentia* he says that specific difference corresponds to substantial form (another ontological oxymoron, if we may put it that way, since the most substantial thing we can think of is identified with an accident). But Thomas's thought does not leave room for misunderstanding: what defines substantial form is difference as an accident.

In order to justify such a scandalous conclusion, Thomas excogitates—with one of his habitual strokes of genius—an extremely brilliant solution. There exist essential differences; but which are what they are we do not know; what we know as specific differences are not the essential differences themselves, but are, so to speak, signs of them, symptoms, clues, superficial manifestations of the being of something else that we cannot know. We infer the presence of essential differences through a semiotic process, with knowable accidents as our point of departure.¹¹

That the effect is a sign of the cause is Thomas's customary idea (much of his theory of analogy depends on this assumption, which is, if we were to trace it back, Stoic in origin: effects are *indicati* signs). The idea reappears, for instance, in *Summa Theologiae* I, 29, 2 ad 3 and I, 77, 1 ad 7: difference such as *rational* is not the real specific difference that constitutes the substantial form

Ratio (reason) as *potentia animae* (a power of the soul) appears outwardly *verbo et facto* (in word and deed), through exterior actions, psychological and physical behaviors (and those actions are accidents, not substances!). We say humans are rational because they demonstrate their rational powers by means of acts of cognition, or by an internal discourse (the activity of thought) or an external discourse, that is, by means of language (*Summa Theologiae* I, 78, 8 co.). In a decisive text in the *Contra Gentiles* (3, 46, n. 11), Thomas says that human beings do not know what they are (*quid est*) but they know what they are like (*quod est*) insofar as they perceive themselves as actors in rational thought. We know what are our spiritual powers only “*ex ipsorum actuum qualitate*” (“from the nature of these same acts”). Thus *rational* is an accident, and so are all the differences into which the Porphyrian tree can be dissolved.

From this discovery, Thomas does not draw all the conclusions he should have regarding the possible nature of the tree of substances: he cannot bring himself (psychologically perhaps) to call the tree into question as a logical tool for obtaining definitions (something he could have done without going out on a limb), because the entire Middle Ages is dominated by the conviction (however unconscious) that the tree mimics the structure of reality, and this Neo-Platonic conviction also affects the most rigorous of Aristotelians.

It is clear, however, if we follow its inner logic, that the tree of genera and species, however constructed, explodes into a swirl of accidents, into a nonhierarchizable network of *qualia*. The dictionary dissolves of necessity, as a result of internal tensions, into a potentially orderless and limitless galaxy of elements of knowledge of the world. It becomes, in other words, an encyclopedia and it does so because it was already in fact an encyclopedia without knowing it, an artifice invented to camouflage the inevitability of the encyclopedia.

1.2.2. *The Utopia of the Dictionary in Modern Semantics*

We see a return to the dictionary model in the linguistics of the second half of twentieth century, where the first attempts appear to postulate or recognize—in order to define the contents expressed by the terms of a natural language—a finite system of *figures* possessing the same characteristics as a phonological system (based on a limited number of phonemes and their systematic oppositions). Thus, a *feature semantics* (features being primitive semantic atoms) was postulated, designed to establish the *conditions necessary and sufficient* for a definition of meaning, excluding knowledge of the world. In this way, in order to be recognized as a cat, something must have an ANIMAL feature, but it is not requested that it meows. These necessary and sufficient features are dictionary markers. Something along these lines was anticipated by Hjelmslev (1943[1961]) when he proposed to analyze the concepts corresponding to the twelve terms *ram, ewe, boy, girl, stallion, mare* through a combination of the *male/female* opposition and the assumed primitives SHEEP, HUMAN BEING, CHILD, HORSE.

Hjelmslev's was not the only modern proposal for a dictionary representation, though the many others proposed in the area of linguistics or of analytic philosophy, almost always in ignorance of Hjelmslev's proposal, did no more than repropose his model.¹²

Reconsidering Hjelmslev's model, we see that a dictionary representation would allow us to solve the following problems (as Katz 1972 will suggest later): *synonymy* and *paraphrase* (a ewe is a female ovine); *similarity* and *difference* (the pairs ewe and mare and mare and stallion have some features in common, while we can establish on the basis of what other features they can be distinguished); *antonymy*, *complementarity*, and *contrariety* (*stallion* is the antonym of *mare*); *hyponymia* and *hyperonymia* (*equine* is the hyperonym of which *stallion* is the hyponym); *sensibleness* and *semantic anomaly* (*stallions are male* makes sense while *a female stallion* is semantically anomalous); *redundancy* (*male stallion*); *ambiguity* (the terms *bear* and *bull*, for example, have more than one meaning); analytical truth (*stallions are male* is analytically true, because the definition of the subject contains the predicate); *contradictoriness* (there are no male mares); *syntheticity* (that ewes produce wool does not depend on the dictionary but on our knowledge of the world); *inconsistency* (*this is a ewe* and *this is a ram* cannot be equally true if referred to the same individual); *semantic entailment* (if *ram*, then ovine).

Unfortunately this model does not permit us to represent what we must know about sheep and horses if we are to understand many discourses about them. It does not allow us, for instance, to reject expressions like *the stallion was bleating desperately like a ram* (justifiable only in a metaphorical context, and a very daring one at that), given that the mechanism of definition does not explain why sound horses naturally emit.

And this is not all. Even if a system of this kind could be implemented based on assumed primitives, and if SHEEP and HORSE were primitives, they would serve to define only a very limited share of the terms concerning part of the animal kingdom. How many primitive features would be needed to define all the terms in any given lexicon? And how do we define a "primitive" feature?

It has been said that primitives are innate ideas of a Platonic nature, but not even Plato succeeded in satisfactorily deciding how many or of what kind were the universally innate ideas (either there is an idea for every natural genus, like *equinity*, in which case the list is an open one, or there are a few

far more abstract ideas, like the One, the Many, the Good, or mathematical concepts, which are insufficient to distinguish the meaning of lexical terms).

It has been said that primitives are elements of a whole that, by virtue of the systematic relationship between its terms, cannot be anything but finite: but this would be a simplified Porphyrian tree or a tree of genera and species good only for the purposes of classification.

It is hard to define primitiveness by distinguishing between analytical and synthetic properties, a distinction severely criticized by Quine (1953a), in part because the notion of analyticalness is completely circular (if a property contained in the definition of a term is analytic it cannot be a criterion for establishing the appropriateness of a dictionary definition).

The possibility of positing a difference between *necessary* and *contingent* properties must also be excluded, because if it were necessary for a cat to be mammiferous and contingent for it to meow, then all “necessary” would mean is “analytic.”

It has been proposed that *finiteness* is a requirement for a packet of primitives (primitives ought to be limited in number, considering that it would be anti-economical to have as many primitives as there are lemmata to define), but it is precisely the cataloguing of this finite number of semantic atoms that has turned out so far to be problematic.

It has been suggested that primitives are simple concepts, but it is difficult to define a simple concept (the concept of *mouse* seems more simple and immediate than that of *mammifer*, and it is easier to define concepts like *emphyteusis* than verbs like *to do*).

It has been suggested that they depend on our experience of the world, or that there are (as Russell 1905 suggested) “object-words” whose meaning we learn directly by ostension, and “dictionary-words” that can be defined by other dictionary-words—but Russell was the first to recognize that *pentagram* is a dictionary-word for most speakers, but would be an object-word for a child who grew up in a room in which the wallpaper was decorated with pentagrams.

The requirement of *adequacy* has been proposed (primitives should serve to define all words), but if we consider as primitives sufficient to define the concept of “bachelor” features like HUMAN MALE ADULT UNMARRIED, why does it seem inadequate to call a Benedictine monk a bachelor? We would have to add other constrictions (for example, a bachelor is an adult human unmarried male *who has not taken a vow of chastity*), and with that we have introduced encyclopedic elements into our dictionary.

The requirements of *independence* (primitives should not depend for their definition on other primitives) and *absence of further interpretability* have been proposed, but not even HUMAN seems without further interpretability if we consider the whole debate over abortion and cloning that is taking place today precisely on the subject of what it means to be human. In reality, in any lexicon any term is potentially interpretable by means of other terms in the same lexicon, or other semantic devices, according to the criteria of *interpretance* and *unlimited semiosis* established by Peirce.

Lastly, if primitives are rooted in our way of thinking, the principle of *universality* suggests itself. It is assuredly possible that certain experiences related to our bodies are universal, such as *above/below*, *eat/sleep*, *be born/die*, but in the first instance it is unthinkable that we can define all the objects and events in the universe in terms of these ideas, and, secondly, universal does not mean

primitive, given that a universally understood concept such as *dying* needs to be further defined, as demonstrated by the debates on end-of-life decisions and the harvesting of organs.

In the face of these criticisms, since the middle of the twentieth century, the conviction has made more and more headway, especially among the theorists of cognitivist semantics, that linguistic competence is always encyclopedic, and that in semantic representation no distinction can be made (except on a provisional basis and for the purpose of specific analyses) between linguistic knowledge and knowledge of the world.

But at this point we must abandon the vicissitudes of the dictionary to trace the historical evolution of the encyclopedia.

1.3. The Encyclopedias

The role of the encyclopedia has fluctuated over the centuries.¹³ The word “encyclopedia” comes from *enkyklios paideia*, which signified a complete education in the Greek tradition.¹⁴ The term “encyclopedia,” however, makes its first appearance in the sixteenth century, first in a different form in Fleming Joachim Stergk’s *Lucubrationes vel potius absolutissima kuklopaideia* (1529), and then in *The Booke Named The Governour* (1531) by Sir Thomas Elyot, who, in chapter XIII, on some reasons for the decline of education among English gentlemen, cites the encyclopedia as the sum total of knowledge, or the “world of science,” or “the circle of doctrine.” This same sum total of knowledge or a complete education is recommended by Gargantua to his son in book II, chapter 8 of Rabelais’ *Gargantua and Pantagruel* (1532):

That is why, my son, I urge you to employ your youth in making good progress in study [and virtue]. You are in Paris; Epistemon your tutor is with you; both can teach you: one directly and orally, the other by laudable examples.

I intend and will that you acquire a perfect command of languages—first Greek (as Quintilian wishes), secondly Latin, and then Hebrew for the Holy Scriptures, as well as Chaldaean and Arabic likewise—and that, for your Greek, you mould your style by imitating Plato, and for your Latin, Cicero.

Let there be no history which you do not hold ready in memory: to help you, you have the cosmographies of those who have written on the subject.

When you were still very young—about five or six—I gave you a foretaste of geometry, arithmetic and music among the liberal arts. Follow that up with the other arts. Know all the canons of astronomy, but leave judicial astrology and the Art of Lullius alone as abuses and vanities.

I want you to learn all of the beautiful texts of Civil Law by heart and compare them to moral philosophy.

And as for the knowledge of natural phenomena, I want you to apply yourself to it with curiosity: let there be no sea, river or stream the fishes of which you do not know. Know all the birds of the air, all the trees, bushes and shrubs of the forests, all the herbs in the soil, all the metals hidden deep in the womb of the Earth, the precious stones of all the Orient and the South: let none remain unknown to you.

Then frequent the books of the ancient medical writers, Greek, Arabic and Latin, without despising the Talmudists or the Cabbalists; and by frequent dissections acquire a perfect knowledge of that other world which is Man.

And for a few hours every day start to study the Sacred Writings: first the Gospels and Epistles of the Apostles in Greek, then the Old Testament in Hebrew. In short, let me see you an abyss of erudition.¹⁵

In book II, chapter 20, Thaumastes praises the young Pantagruel’s culture, saying: “I swear I

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