The relation of logic to semiotics*

JOHN N. DEELY

> Now it is hard for a logician trained in the contemporary variety of logic to think himself into another. In other words, it is hard for him to find a criterion of comparison. He is constantly tempted to find what is valuable only what fits into the categories of his own logic. Impressed by our technique, which is not by itself properly logic, having only superficial knowledge of past forms, judging from a particular standpoint, we too often risk misunderstanding and under-rating other forms. ... The modern mathematical logician certainly has a strong support in his calculus, but all too frequently that same calculus leads him to dispense with thought just where it may be most required.
>
> Bochenski 1961: 17

Introductory

From the opening sessions, participants in the first annual International Summer Institute for Semiotic and Structural Studies at Victoria College of the University of Toronto felt the excitement of an intellectual event of considerable, perhaps historic, significance for the intellectual movement that has been gathering momentum across national and traditional disciplinary boundaries, particularly since World War II (cf. Sebeok 1974, 1975). One had a prescience that repercussions of this particular gathering of students and scholars would be felt throughout North America, for a long time to come. In the period of new beginnings and interdisciplinary experiments inspired by the ideal of a doctrine of signs uniting the realms of speculative and practical knowledge, one had the feeling of being present at a moment of simple origin, that a beginning of particular fertility, a truly seminal event, was afoot with ISISSS '80.

One especially noteworthy feature of the ISISSS program was its length — an entire month — as well as the comprehensiveness of its courses and lecture themes. Here for the first time, students of the full range of interests and disciplines comprising the semiotics movement were brought together in a framework that made possible extended exchanges and

acquaintanceships, in fruitful and pleasant contrast with the brief two>- or three-day conferences which alone are normally possible for scholarly meetings. An upshot of this extended exchange was a further balancing out of the proportions of the overall movement as each eye is able to grasp it, and in particular a bringing into focus in Eco's lectures of the foundational issues and of the privileged position of the philosophical disciplines in contributing to such clarification. Historically, and by accidents of national intellectual traditions, followers of Ferdinand! de Saussure in particular and scholars with backgrounds in the languiage sciences generally early constituted a kind of sociological majority witthin semiotics. Within this nucleus and beyond, there has been a gradual awakening of consciousness to the extensive writings of Peirce as the ttrue contemporary founder of a systematic foundational doctrine of signs and, even more importantly, to the historical layers of semiological analysis that preceded explicit adoption of the viewpoint given its proper name by Locke in 1690, but already defined exactly in the openings of Augustine's first two books *On Christian Doctrine* (c. 397-426), explored systemati- cally with an eye to the whole of our Greek and Latin past in the *Treatise on Signs* of John Poinsot (1632), and palpably present in the origins of Greek medicine as a 'reading' of the human body in terms of sickness and health. This awakening has engendered within the movement a renewed sense of expansion and of the value and necessary function of intellectual tradition, in precisely that sense of continuity between past and present concerns of the human spirit which has been thought dispensable by most intellectuals enamored of positive science since the days of Hobbes and Descartes.

An inevitable result of this awakening — this historiographical *prise de conscience* of semioticians — has been the experienced need for an 'archeology of concepts' (in the felicitous expression of Eco) related to the sign and semiosis, if we are to understand the true dimensions and possibilities made accessible by the semiotic point of view seeming, as it does, to call for a general rewriting of the history of philosophy and culture from ancient times to the present. In this atmosphere, the potential contribution of philosophy to semiotic consciousness — or rather, the conspicuous absence for the most part of contributions to semiotfc consciousness from the philosophers of our day — has created a kind cf vacuum within the movement of precisely the sort nature abhors, and one which semioticians too are eager to see filled.

It was thus with particular enthusiasm that the third weekend col- loquium within the ISISSS '80 framework, 'Fiction: Logical and semiotfc perspectives' (June 20-21), was billed and anticipated, as Professor Pavd put it in his remarks opening the colloquium, as 'the first formal contact

between professional philosophers and semioticians'. The format was promising for an especially fruitful exchange. Fiction, like lying, is a semiotic phenomenon par excellence. Logic occupies a pride of place in contemporary North American and English philosophy. Some of th6 philosophers most revered in the English speaking world today — figures like Quine, Frege, Russell — are distinguished logicians. Logic also occupies a central role in the semiotic researches of C. S. Peirce, the foremost background figure of contemporary semiotics, as noted above. Indeed, Fisch (1977: 36) considers Peirce's focus in this regard 'his single most characteristic trait', in that

Peirce from the beginning conceived of logic as coming in its entirety within the scope of the general theory of signs; that all his work in logic had been done within that framework; that, for a time in his fifties he distinguished a narrow and a broad sense of logic, in the latter of which it was coextensive with the general theory of signs; that eventually he abandoned the narrow sense; and that the comprehensive treatise on which he was working in the last decade of his life was to be entitled *A System of Logic, considered as Semiotic.*

So, it would seem natural and almost inevitable that logic should provide a fertile common ground for a rapprochement between the semiotics movement and the traditional discipline of philosophy.

Yet, the semioticians attending the colloquium found, to their general dismay, not to say consternation, that such was anything but the case. The philosophers, conspicuously reliant on the quasimathematical formalized logical techniques so prized in their circles, didn't seem to have much to say to semioticians and didn't even seem all that interested in semiotics, save (as it were) as an unexpected new forum for exhibiting their established techniques of analytical acrobatics, performed, in the audience's perception at least, largely in thin air.

It was the witnessing of this performance that inspired this essay, presented originally as a part of the ISISSS '80 Evening Lecture Series on June 24. In effect, what I present here is a hypothesis as to why the distinguished philosophers invited to the ISISSS Colloquium, precisely because of the conception of logic in very recent philosophy, had almost nothing to say of general interest to the semioticians.

To develop this hypothesis, I must employ a method basically similar to that used by Eco in his first lectures (June 2-6), presenting the concept of sign as it developed over the period from ancient Greece up to the time of Augustine. The method consists in elaborating an archeology of concepts pertaining to a stated theme or central notion, in Eco's case that of the sign, in the present case that of *logic itself.*

Following proven canons of academic practice which require us to narrow our topic to a focus sufficiently precise to be treated accurately, then, I am going to consider the Western tradition solely from the point of view of Logic, and, to be even more precise, I am going to restrict my consideration to the period from the work of Aristotle to the present. While this precise tocus may not seem exactly 'narrow' in the sense usually applied to an academic thesis, we will see that it is an adequate specification for the purposes of the method we wish to follow as it applies to the problem, or hypothesis, we have set ourselves to explore.

Prospective

This essay is a first attempt to establish an outline of the history of Logic expressly from the standpoint of a doctrine of signs, as defined by John Locke under the heading of semiotic. No effort has been made to explore for itself the standpoint so defined (which would require an entire treatise). What has been attempted, rather, is to indicate in a summary fashion and from the point of view of a philosopher a general sketch of the place and circumstances in Western culture where semiotic consciousness was first thematically achieved, to the extent at least that we are able to determine this in the light of the history of logic and philosophy as the 'experts' present it to us, supplemented of course by an actual reading, first-hand, of the texts on which the outline relies, not all of which, by any means, have been weighed evenly if at all in the researches so far of the expert historians. This fact already indicates the extent to which semiotic historiography will be achieved only by upsetting and revising, often in radical ways, the conventional outlines and histories of thought which have become standard fare in the universities of today.

The circumstances which led to the composition of this outline have already been stated. In revising the text for publication, I have decided to follow the advice of Jean Umiker-Sebeok, who urged that it be published basically as it was spoken, without trying to add too much in the way oi new detail or further documentation. For whatever value this presentation may have lies more in its heuristic than in its didactic aspect, according tc the saying of Aristotle in .his *Ethics* (1098a: 20-25), that time is a gooc partner in the work of advancing the articulation of what has once beer) well outlined, but in the absence of such an outline, progress in the art* and sciences tends toward a standstill. That is what I have been concerned to establish — the possibility of an integrated perspective on semiotic development grounded in the unity of philosophical culture which has been obscured for some three centuries now, but which semiotics makes it possible to realize again.

Hence there remain gaps in the outline, to be sure: it is subject to many retouchings and additions. But it illustrates the method, I think, by which semiotics is bound to establish itself in general outlines and foundations. I have called this method an 'archeology of concepts', as the metaphor best calculated to convey what is necessary. I would like to add that the use of such a method — the uncovering of the layers by which concepts ultimately taken for granted in some specific population acquired their illuminative power for human culture (it is this process which constitutes the historicity, the *Seinsgeschichtliches Wesen,* of man) — gives particular grounds for optimism in the eventual fruitfulness of its results, for 'in literary history, as contrasted with [physical] archeology, the forays of enthusiasts do not destroy the evidence. On the contrary, they may provide the stimulus to research by which their own errors can be corrected' (Kneale and Kneale 1962: 224).

Exploratory

Logic, like so much of our intellectual history, has its origins in ancient Greece, and specifically, it has its origins in the books of Aristotle. The early editors (beginning c. the third century) grouped these works under the general title *of Organon* or *Instrument.* Their subject matter is basically terms or objects of apprehension (in the *Categories),* propositions (in *On Interpretation),* and argumentation (in: the *Prior Analytics,* which deals with the forms common to any processes of reasoning; the *Posterior Analytics,* which deals with the relation of the forms of reasoning to particular subject matters for purposes of proving something about that material; the *Topics,* which deals with probable — what Aristotle calls 'dialectical' as opposed to 'demonstrative' — proofs; and the *Sophistic Refutations,* which deals with the unmasking of specious arguments). So you can see that the conception of Logic in this original adumbration is rather comprehensive in relation to our cognitive processes, and became even more so in later medieval Islam, to be sure (see note on Reference entry 'Aristotle').

But the point to note for present purposes is that Aristotle, who was the first to discover or invent (depending on the point of view you want to take) the subject of Logic, did not include logic within his own classification of the sciences. He regarded logic rather as the common or general instrument for the development of science; and knowledge itself, comprised of the sciences wherein logic would be employed, he organized as shown in Figure 1. For the development of these sciences or forms of knowledge, logic would be the instrument that would principally be employed, particularly the analytics.

KNOWLEDGE

```
                    |                                              |
              SPECULATIVE                                     PRACTICAL
                    |                                              |
      |             |             |                 |             |
PHYSICS or    MATHEMATICS   METAPHYSICS       ART — the    ETHICS —
'NATURAL                                      science of   the science
PHILOSOPHY' —                                 making       of doing,
i.e., philosophical                           things, any  i.e., of the
understanding of the                          production   normative
physical universe                                          regulation
                                                           of human
                                                           action
```
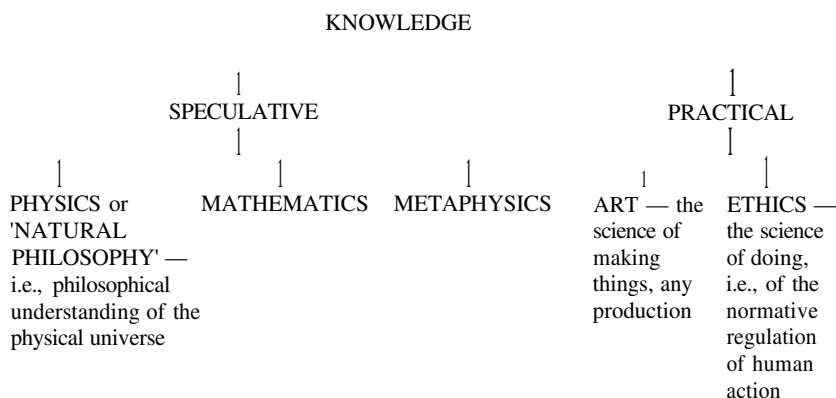
Figure 1.

After Aristotle, there was the rather different development of Stoic logic, almost all of which has been lost; so that, for our purposes, there is not a great deal to be said about this development, especially as, up to very recent times, in the post-classical civilizations of Europe the works of Aristotle in logic really provide the main backdrop against which logical development took place.[1]

But there was one division of knowledge, apparently from the Stoics,[2] which continued to influence in a subsidiary way the thought of the middle ages. St. Thomas Aquinas, for example, falls back on this Stoic division in setting the framework for his commentary (c. 1269) on the ethics of Aristotle, where he remarks (Book I, lect. 1, nn. 1-3) that knowledge is of order, but order can be of four different kinds (see Figure 2).

We have then from ancient Greece two rather different grand schemes of knowledge, the first, which was the primary one that was taken up and

KNOWLEDGE is
of the ORDER
which :he mind

```
        |                      |                     |            |
finds in things         finds in its own       puts into    puts into
of the physical         workings: RATIONAL     behavior:    things:
world: NATURAL          PHILOSOPHY or LOGIC     ETHICS       ART
PHILOSOPHY[3]           (ëüãïò)
```
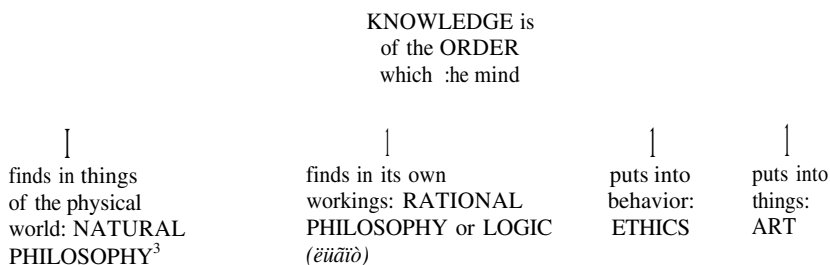
Figure 2.

used in the middle ages, from Aristotle; but also, in the background, as it were, a second scheme providing an interestingly different distribution of knowledge which seems to have been basically Stoic in origin, and which expressly includes logic within the scheme of the sciences.[4] We will have occasion later on to remark some relations — similarities and differences — between this Stoic division of knowledge and the organization, for the sciences that Locke proposes in the seventeenth century in his *Essay Concerning Human Understanding.*

Besides the logical writings of Aristotle himself, the really important development in Logic for Western culture, historically speaking (I mean, in terms of the development of Logic as a part of the general philosophical culture, not in terms of the specific development of specialized parts within logic as a specialized discipline), does not then come from the Stoics but rather from Porphyry, the student of Plotinus who authored c. 271 the little book that was to influence the entire age of Latin philosophy subsequent to the fall of Rome (i.e., the European schools from Boethius to the very end of Renaissance times), namely, the *Isagoge,* which literally translates as 'Introduction', but more accurately as the Tive Words', because what the *Isagoge* is about is the ways in which we apply our concepts to things when we seek to define what any one of them is — a theory of definition, if you like. The five words that are involved in such efforts are genus, species, difference, property, and accident, according to the following rationale.[5]

In saying what any thing is, we describe it either in terms ofjwhat it is essentially, or in terms of characteristics it has over and above its essential constitution. If our statement captures the essence of the thing, it may do so wholly or only in part. If wholly, then we have *species',* but if only in part, we may have either that part which, though essential, yet pertains to the essence of other kinds of things as well, which is *genus',* or that part which is unique to and constitutive of the thing as distinct within its genus, which is *difference.*   On the other hand, if our statement captures not the essence of the thing of which we speak but rather characteristics or attri-butes over and above what is strictly essential to it, these characteristics may be either necessarily consequent upon what is essential, in which case we have *property,* or merely contingently advenient upon the essential constitution, in which case we have *accident* (not to be confused with the category of 'accident' in the sense of whatever is not a 'substance' in the scheme of Aristotelian physics). Since this division of the ways of possibly speaking about things is exhaustive and exclusive from the standpoint of analysis, it is clear that any classification of types of definition which attempt to express what something is, intrinsically, can be referred to and explained in terms of it.

Porphyry wrote his *Isogoge,* which we have thus summarized very roughly, as an introduction to the study of the categories of Aristotle, and eventually it came to be studied everywhere in the Latin world as an excellent general introduction to the study of logic as a whole. Porphyry wrote in Greek, but within approximately two hundred years, with the fall of Rome, and for the millenium after that, the knowledge of any tongue other than Latin became completely lost to the development of European civilization. The figure who interfaces Greek logical tradition with what would develop in the West was Boethius (c. 480-524), the not-quite contemporary of St. Augustine (354-430), a figure of no importance to the development of the logical tradition as such in the Latin age, but one who is always listed along with Boethius as beginning the *mediae aetates,* and one who, moreover, as far as my own researches have gone, emerges from the point of view of semiotic itself as the first figure to absolutely enunciate a pure semiotic standpoint, to wit, in *his De doctrina Christiana* (c. 397-426).

Augustine opens Book I of this work with the distinction between signs and things, saying he will devote Book I to the consideration of things, and Book II to the consideration of signs. But, when he comes to the second Book, a very curious thing happens. He begins by enunciating what we would call a semiotic point of view — the treatment of things purely in terms of their signifying function. He then introduces a whole series of distinctions covering practically the entire range of semiotic phenomena — natural versus conventional signs, signs as they function in animal cognition versus their function in human cognition, words and groans, flags — but he distinguishes all these phenomena only in order to exclude them as not being germane to his more limited immediate purpose. Thus he begins with distinctions that establish the semiotic point of view and sweep over the horizon of prelinguistic, linguistic, and postlinguistic semiotic phenomena, but only for the sake of narrowly identifying the specific case of conventional signs instituted by God. namely, the words of Scripture and the Sacraments of the Church. Augustine's definition of the sign in this context, then, particularly after its inclusion in the 4th book of Peter Lombard's *Sentences* (c. 1150), becomes the focus of what is in effect the 'high semiotics' of the Latin age, namely, sacramental theology as it develops after Augustine continuously right down to the present day and to a great extent even across the post-Reformation denominational lines of competing Christian sects. For thai specifically religious phase of historical theoretical semiotic development as for many others, Augustine stands astride the split of renaissance Christianity into Catholic and Protestant as a kind of governing figure over the thinking of both sides.

Important as he is, therefore, for the general history of semiotic one day to be written in terms of our immediate archeological quest, Augustine hasn't much to say on logic in its traditional development, so I pass over him without further comment, in order to discuss the more central role of Boethius.

Boethius set himself the project of translating into Latin and synthesizing through commentaries and other treatises the whole range of the works of Plato and Aristotle, in order to make them accessible to the decreasingly Greek and increasingly Latin world of learning, such as it was in the last days of the Roman empire. He got well along in this task, writing elaborate commentaries, including two on Porphyry's work, one a *Dialogue* on an earlier Latin translation (ante 509), the other (509-510) a *Commentaria* proper; and specifically completing translation of the *Organon,* before he was garrotted for treason under Theodoric (the Ostrogoth), thus bringing to an abrupt end his project of Latin translations and treatises. The tragedy of this (apart from the more personal, we might say subjective, tragedy for Boethius himself) was that no mainstream thinkers of the Latin West appear to have had much public access to the original veins (or *linguistic* community) of Greek thought, i.e., from Plotinus backwards through the Stoa, of course the Epicureans, and into the original schools of Megara and Athens, of which Aristotle still seems to have been the predecessor by some seventy or so odd years, from the standpoint of a *formal* logic.

But the situation was worse than so far appears. Not only would no *new* Latin translations, either of existing or of heretofore untranslated manuscripts, come into existence; but even most of those pertaining to the integral problematic of *the Instrument* or *Organon,* i.e., the Boethian translations themselves beyond the *perihermenias* text, were totally ignored and forgotten!

We know this, both from the certainty that Boethius did in fact render the whole of the Organon, as well as develop syllogistic treatises in his own right (see entry for Boethius in the References); and from the certainty that when the revival of interest in the more integral problematic of the Greek traditions began to show itself in the form of new translations of the heretofore unstudied 'organonic' works of Aristotle — from the Analytics on, i.e., the entire third level *(ratiocinatio)* of the *ëüãïò* problematic in specifically human speech — a *versio antiquior* of (1) the *Prior Analytics,* (2) *Posterior Analytics,* (3) *Topics,* and (4) *Sophistics* began to be circulated under Boethius's name, 'probablement a bon droit', as Cappuyns puts it (1937: 362).

We know then that Boethius's actual manuscript translations not only existed for the *Organon,* but were still accessible as late as 1150. These

directly authentic manuscripts are now thought to be possibly lost entirely, but certainly not to be the later translations which are figured as Of Boethius' in Migne, P.L. 64 (1891). To us, as to the 'dark ages' preceding the eleventh and twelfth centuries, only the first two organonic works, the *Logica vetus* of the Middle Ages, are accessible. Not all the writings 'generously attributed him by tradition' (Cappuyns: 362) are in fact his writings.

He was certainly the introducer of Aristotle to the Latin West, but what a fragmented and prismed introduction![6] As Cappuyns summarized the situation as of 1937 (col. 376):

The exact role of Boethius in the transmission of the works of Aristotle is difficult to determine as of yet, and, even in the manuscript materials which exist attached with his name, the decisive separation between the authentic and the spurious attributions cannot be made today. To achieve any results in this matter which can be taken as verified, we must wait until the *Corpus philosophorum Medii Aevi* has published versions of all the relevant Aristotelian texts, and upon the development of more refined techniques of comparative philologies to supplement the customary external criteria which are insufficient in the case of the *versiones Boethii*. That means that the conclusions already formulated by A. Jourdain (1843) must be revised radically.

Tentatively, and in line with such historical reservations of an empirical type, we can say that, sociologically speaking, the community of early with later Latin logical thought was sustained in terms of Greek Logic's problematic by the rather thin corpus comprising the *Isagoge* with the commentaries and the *Categories,* together with translations of *Peryermenias (On Interpretation).* These were the works that formed the body of study of 'the old Logic' when the new world of learning, the revival out of which our modern universities would come, began to gell around the twelfth century. In the excitement of that new awakening, the contribution of Boethius, small by comparison with the Greek heritage, but small also by comparison with horizons Boethius sketched for a century with no eyes for them in the translations he actually accomplished of the *Organon,* seemed so dazzling in its scope and daring (for all its lack) that the first half of the twelfth century has been called by custom in history 'the Boethian Age', i.e., the last age restricted, in its thematic development of the *Organon,* to texts anterior to both the *Analytics.* And when, after the mid-twelfth century, the influx of further translations of the Greek authors forced the rest of the *Organon* to be looked at in Latin (the *Prior* and *Posterior Analytics,* the *Topics,* and the *Sophistical Refutations),* authors began to speak of the new translations as the 'ars seu logica nova' or new logic, in contrast to the 'ars seu logica vetus' of the Boethian age and earlier.

Here a fact of great importance for the eventual history of semiotics should be mentioned in passing, namely, that in translating the *Categories* of Aristotle, and more particularly through his *Commentary* thereon (510), Boethius set the terms for the controversy over the reality and nature of *relations, ens relativum,* which would culminate in theology in the rational account of the Trinity achieved by the medieval scholastics, but in philosophy in the apparently first systematic treatise on signifying (Poinsot 1632). Here, perhaps also for the first time, the definition of signs laid down by Augustine is firmly repudiated as inadequate and the foundation is laid for fulfilling the project for Logic first outlined outside the Greek or Latin world by John Locke in 1690, namely, the project of subsuming the internal means of cognition ('ideas') and the external means of communication ('words', gestures, etc.) under the single per-spective of signifying in a foundational *doctrina signorum.*

The central role of Boethius in our present investigation thus may be summarized at this point under two heads. The logical tradition from ancient Greece is kept alive by his work through the early centuries of the Latin age, and the discussion of relative being, of which signs are but a special case, gets off the ground in the Latin West as a result of that same work.

What happens as the twelfth century advances is that the entire literary corpus of Aristotle, including the *Organon,* is translated into Latin, and the writings of the *Organon* begin to be studied as a whole. This 'new logic' Cars' or 'logica nova') — at the opening of the thirteenth century — is, so far as its pure foundation in the texts of Aristotle goes,[7] no longer the analysis of simple terms and of the results of judgments combining terms into propositions (the attachment of predicates to subjects), which was the focus, respectively, of the *Categories* and *Peri Hermenias,* so-called (**On** Interpretation'); but is now the combining of propositions into arguments, which is the concern, as we have seen, of the two *Analytics,* the *Topics,* and the *Sophistic Refutations.*

Here we must note a third point of influence of Boethius on the schools of the high middle ages and the renaissance, namely, his representation at the beginning of his treatise *On the Trinity* (c. 520) of the division or scheme of the sciences which we have already seen in Aristotle. This little work on the Trinity, everywhere read and commented upon in the medieval schools, thus became a main vehicle for the shaping in an Aristotelian mold of the outlook on knowledge of the mainstream Latin philosophizing of both the middle ages and the renaissance. Thus Aristotle's original division, filtered to be sure through the Platonic and Neoplatonic influences that filled the mind of Boethius, but nonetheless unmistakable in its ancient origin, became the main division used in the

theoretical discussion of the thirteenth, fourteenth, and fifteenth centuries, and even later. According to this way of looking at knowledge, it will be remembered, 'logic is not included under speculative philosophy as a principal part but as furnishing speculative thought with its instruments^ (Aquinas c. 1255-1259: Q. 5, art. 1 ad 2).

In order to advance in our own investigation, therefore, we have to take leave at this point of the influence of Boethius on the Latin ages and look rather at another division of the objects of knowledge that is also characteristic of the middle ages, but more indigenous to it and more instructive for our purposes, namely, the primary division that they made of being — *ens,* that which is or can be — as the first object *(primum cognintum)* of human awareness, into *ens reale* and *ens rationis.*

From the point of view of the analysis of the order of primitive concepts as originating in sensory experience, the medieval scholastics had a generally accepted saying that 'primum in cognitione cadit ens' — being is the first thing that the human mind grasps. For them, *ens* was the term designating the start of human experience: from the initial grasp of being the whole of our experience will be articulated. And the first division of being, that is, the first contrast given in our experience of the world, is the contrast within *ens* between real being, by which they meant what exists independently of the mind, *ens reale,* or mind-independent being; and *non ens,* more commonly termed *ens rationis* by reason of the framework of their preoccupations, by which they meant what exists consequently and dependently upon the mind's own workings.

Right away, notice the hook-up between this notion of *ens rationis* and the Stoic notion mentioned above of *philosophia rationalis:* mind-dependent being, the order which the mind through its cognitive workings introduces into things, which *has no existence apart* from the mind's cognition.

Non ens, 'non-being', is an initially puzzling designation, no doubt; but *ens rationis,* the more common designation for what is being distinguished, appears retrospectively, from outside the medieval framework of preoccupations, at least, as a positive misnomer, one which has in fact created no end of misapprehensions among the students of medieval thought in our own day. Literally, and in the standard modern readings, *ens rationis* Obviously' means in English *being of reason.* And yet, according to the Aristotelian psychology or life-science developed by the Latin scholastics (discussions in Deely 1971, 1972, 1974, 1975a, 1978a, 1980, 1982: III.C. and D.), animals also, more precisely, the higher animals, those species endowed with the powers of internal sense and therefore capable of perception, form 'beings of reason' in the course of structuring through experience their awareness of the environment,

although in this theory such animals of course have no reason — *ratio*—
in the sense of *intellectus,* or understanding! Not to see this point is to miss
one of the potentially most important points of medieval scholasticism for
the eventual development of the doctrine of signs, as John Poinsot (1632:
301al-306b45, i.e., in the First Preamble to the 1982 edition) was so
skilfully and with consummate subtlety to show in that later period which
can be viewed with equal justice as the twilight of the Latin age or as the
dawn of modern times. Hence, instead of perpetuating the misunderstand-
ings latent in the translation, 'being of reason', let us simply translate *ens
rationis* as *mind-dependent being.*

   Hence *ens rationis* itself can be divided into what we might call
(forgetting for a moment that we have just repudiated the standard
rendering, for the sake of emphasizing through paradox the point of our
repudiation) *perceptual beings of reason,* to wit, *entia rationis* formed by
higher animals as well as by men, a subject in which the medievals
typically took almost no interest; and *conceptual* or *intellectual beings of
reason,* of which the Latin schoolmen recognized the possibility of
distinguishing several different kinds or sub-species, but the only kind in
which they were really interested was something that they called *second
intentions.* What they meant by a 'second intention' is fairly straightfor-
ward. Whenever you know something, insofar as you know it, it becomes
an object of thought or awareness. In so becoming, that object acquires as
such, i.e., as existing for awareness, certain characteristics — e.g., you are
able to *predicate* things of it: predicability thus would be a second
intention. Something can only be the subject of a proposition insofar as
someone is thinking about it. So, second intentions generically are the
characteristics that things acquire as they exist in intellectual awareness.
Characteristics that things have independently of awareness, Outside' of
the mind, as it were, or 'in nature', they called *first intentions:* but the
further characteristics these same things acquire as they come to exist
within the mind are second intentions. And specifically, these second
intentions are the ideas or concepts corresponding to the five words of
Porphyry — genus, species, difference, property, accident. Moreover,
these second intentions, among the many kinds of mind-dependent being
which could be distinguished, were the kind the Scholastics were prin-
cipally focused upon because they thought this was the subject matter of
logic — the order that the mind in its own workings introduces into things
in order to know reality was the second intentions. The order of what is
dependent on the mind in its specifically intellectual dimension was
distinguished from the order of what is independent of the mind so that
the mental constructs might be rightly structured — that is, critically
controlled — so as to reveal the structure of reality, as shown in Figure 3.

ENS →   → —   —». The movement of
    I   reason from ＼

    I   I   its awakening N^
REALE: ⁴RATIONIS':   inexperience   ＼
the Categories   ,   I   .   to the understanding

        Perceptual   Conceptual   of 'what is'   ＼,
                                I   ＼

                                                    SECOND
                                                    INTENTIONS
    ＼
      ＼
            terra non considerata
                ✳
                •

            social and   the Predicables —
            cultural   notions we form in
            determinations   order to talk about
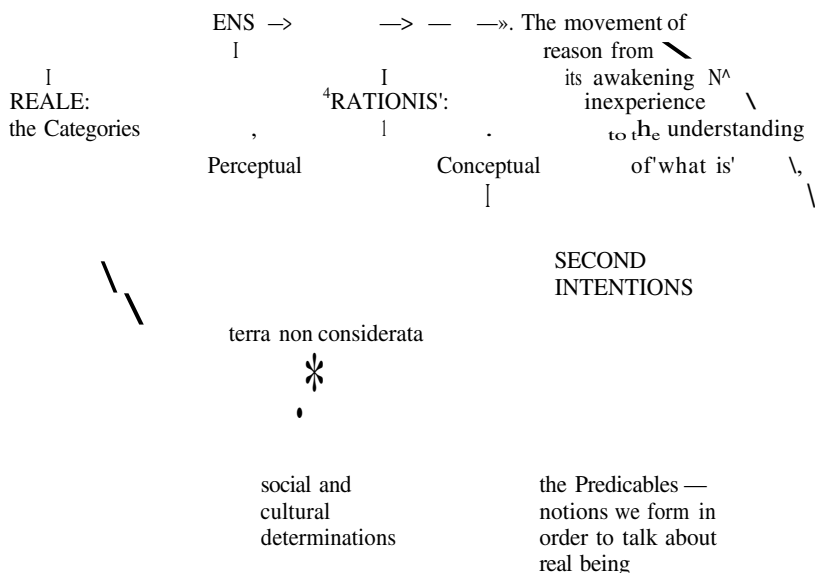   real being

Figure 3.

The five words of Porphyry which were used from the earliest days of the Latin era as the introduction to the study of the categories in the *Isagoge* were called *predicables.* But the division of real being — *ens reale:* the mind-independent realm of nature encountered in our sensory experience — is what Aristotle's book of *Categories (predicaments)* is all about.[8]

So you can see why, in Porphyry's pedagogical scheme, if the categories (substance with its various modifications or 'accidents') are the divisions expressive of being as it is able to exist independently of our thinking about it, and if being in this sense — *ens reale* — is what we are interested in understanding, then the study of the predicables, the second intentions, would be an introduction to the study of the structure and classification of reality. And that is precisely the purpose that logic served within the mainstream philosophical systems of the Latin middle ages and re-naissance times — a general instrument for acquiring knowledge of reality. Hence their almost exclusive concern in that dimension or type of mind-dependent being that they were really interested in was that aspect of mental construction which could be critically controlled for the purpose of identifying and segregating within the confusion of experience *(ens ut primum cognitum)* those aspects or elements which belong fundamentally to the order of what is independently of us — the constructs the mind would make in order to know the real.

This gave a precise focus to the problematic of Logic as it came to the Latin West, to our civilization, in its integral Aristotelian form. Logic they defined as the art enabling us to proceed with ease, order, and correctness in the act of reasoning itself: 'and thus it is seen to be the art of arts, because it directs us in the activity of reasoning, whence all the arts proceed'.[9]

A further attempt to organize and clarify the integral problematic of logic embodied in the *Organon* is seen in the Latins' application to that problematic of the distinction between 'form' and 'matter'. Already in the thirteenth century we find this terminology being used for the 'logica nova', in the opposition *of formal* to *material logic,* which is represented in somewhat simplified form in Figure 4.

The new way of speaking therefore is pretty straightforward. 'Formal logic' is concerned with the consistency of thought regardless of its content — pure consistency as such of thought: form; inner consistency. And this corresponds in the logical works of Aristotle especially to the books of the *Prior Analytics,* though also of course to the treatment of propositions in the *Peri hermenias,* which is ordered to the discussions of the *Prior Analytics.* Indeed, that the *Prior Analytics* subsumes the central problematic of formal logic conceived as the concern with internally consistent structure remains true down to the present day (Bochenski 1961).

On the other side, the *Posterior Analytics* of Aristotle can justly be regarded as the first treatise on scientific methodology in the West, for this was the logic of proof, concerned not merely with the consistency of

LOGIC: the art whereby
we are enabled to proceed
with ease, order, and
correctness in the act
of reasoning itself

FORMAL: the
question of the
inner consistency
of thought, subsumed
in the *Prior Analytics*

MATERIAL: the
question of the *corres
pondence* between the
forms of thought and
the forms of the real
world (the content of
thought), subsumed in
the *Posterior Analytics*

Figure 4.

thought within itself, but with the *application* of consistent thought to the content of experience in order to show why the world is the way it is. In general, then, 'material logic' is concerned with the correspondence between the forms of thought and the forms of the natural world.

Fallacies in reasoning can be similarly divided. There are *formal fallacies,* namely, those which can be detected by purely mechanical means, so to speak, because they violate the canons of inner consistency. Such are the celebrated (if misnomered) 'truth tables' of logic in our own time, etc. (Figure 5). Material fallacies, on the other hand, spring rather, in contemporary terminology, from mismatchings in the semantic field or space of a given linguistic community, e.g.:

The delegates to the Democratic Convention come from all 50 states.
Harry is a delegate to the Democratic convention.
Therefore Harry comes from all 50 states.

Yet — and this is a very important point — having introduced the distinction between 'formal' and 'material' logic, the medieval schoolmen and their successors in the renaissance mainstream did not not extend the distinction in this hard and fast way to the consideration of the fallacies or indeed to many other details of logical theory. On the contrary, the 'formal' logic itself as it was developed in the universities treated both kinds of fallacies in the context of the general introductory logic or prior analytics, and for a very good reason, namely, the fact that the sign system in terms of which they wanfed to explore logical relations was what we now call a 'natural' language — English in our case, Latin in theirs.[10] Stipulated symbols as such were used, to be sure, in the exposition and development of formal logic, but in a purely secondary and subordinate way. The main thing the Latins were interested in was seeing how the workings of the mind relate to the understanding of the real world of experience as we have seen; and the principal medium for that is a natural language. Artificial symbols were used only as convenient devices for explaining the workings of the system of signs comprising the actual language of the community. 'Scholastic logic', in summary, is 'a thorough-going attempt to grasp formal laws expressed in natural language (Latin)

P	q	p-q
ô	ô	ô
Ô	F	F
F	Ô	F
F	F	F

Figure 5.

with plentifully differentiated syntactical rules and semantic functions'
(Bochenski 1961: 13).

'Formal logic' thus in the medieval and later renaissance worlds of
Latin learning came to have a particular meaning, directly linked, after
1150, to the technical problematic of Aristotle's *Prior Analytics,* but also
linked directly and more fundamentally to the general problematic of the
primary access to intelligibility afforded the mind by the resources of its
native linguistic community. This twofold attraction for logical research
— one purely technical (which the Latins, under Arabic influence, came to
call *logica docens),* the other purely instrumental (which the Latins, again
under the Arab influence, called *logica utens)* — gave rise in the Latin
world to a singular development, cardinal in importance for semiotic
historiography. Besides the early medieval Aristotelian heritage of the
logica sen ars vetus and the distinctively high medieval acquisition of the
integral Aristotelian logic called the *ars seu logica nova,* influenced by the
logica nova but rooted in rich, para-Aristotelian Boethian and Stoic
heritage of a propositional logic and nascent syllogistic (de Rijk, 1962),
the introductory course in logic as it gelled in the Latin universities of the
renaissance came to possess, beginning from the earliest period of the
universities' foundings in the twelfth century, a uniquely rich, inde-
pendent, and common flavor throughout Europe (the *Latin* world)
precipitated typically by the unique and precious treatise (c. 1245) of
Petrus Hispanus titled the *Summulae Logicales.* The influence of this work
was twofold.

On the one hand, Peter's little work is filled with mnemonic devices and
verses by which the different types of propositions, the moods (i.e., valid
forms) of the syllogism, and the rules determining those forms can be
readily mastered by beginning students. So ingenious was Peter of Spain's
format in this regard that his basic formulae have survived even the
transition around the seventeenth century from Latin to the modern
national languages, and are still in use today with beginning students in
logic. One can only imagine how much more effective these mnemonics
must have been to those earlier students whose native tongue was that
Latin from which Petrus Hispanus crafted and organized his verses. In this
respect, Peter's work has never been surpassed, which in part explains its
nominal and wide influence in the Latin world: 'This work came to be
accepted as the standard textbook of logic through all the later Middle
Ages and was still in use as late as the beginning of the seventeenth
century' (Kneale and Kneale 1962: 234; but note Ashworth's caveat, 1974:
2: 'the picture is altered considerably when one looks at dates and places
of publication'[11]).

On the other hand, the independent development of Peter's treatise,

taking account of the *logica nova,* but integrating it objectively according to the demands of the subject matter with other and prior notions, instead of following the newly developing fashion of commentary on the Aristotelian texts which was fast becoming the staple of the curriculum of arts in the new universities, set a pattern which, particularly within the Iberian university world (Coimbra, Salamanca, Alcal), came to be synonymous with formal logic *iise\f(ⁱanalyticapriora'ᐳ).* Within this world, 'summulae' was often used (e.g., Soto 1529; Banez 1618; Poinsot 1632) as a synonym for 'formal' or 'introductory logic', and strict Aristotelians were known to complain of the independent course summulist logic had taken![12]

Thus, in the later Latin period (post-1200), three compenetrating but distinct logical arenas or zones are discernible, the Aristotelian *logica vetus et nova,* and the summulist *logica modernorum,* also commonly referred to, especially after the *Summa Logicae* of William of Ockham *(inter* 1317-1328) as *terminist* logic, because the logical forms common to all reasoning were introduced in light of the properties of terms, particularly of the contrast between the properties terms have as simple elements of discourse *(significatio)* and the further properties they acquire through their employment in syntactical arrangements *(suppositio, copulatio, appellatio,* etc.). Of these three, then (the *logica vetus, nova,* and *moderna),* the *logica moderna* or *modernorum* became the textbook tradition of logic for the renaissance period and beyond, relating to the integral problematic of Aristotle's *Organon* roughly on the pattern shown in Figure 6.

Formal logic was seen as beginning with the study of simple terms, commonly identified with single words — e.g., 'man', 'horse', 'tree', Or', 'and', Of. Primary among these simple terms were those pertaining to

Prior Analytics (or 'Formal Logic'):　called 'Minor' sometimes
(after 15th century?)

3 Terms　　　　　　　\^ TERMS: the Categories or Objects of Apprehension
"*^ᐳ^
S-P in Major　　　—*X　　as Logical Operators or Units of Discourse

or Minor=4 positions^　　PROPOSITIONS: 'Perihermenias' or results of
tr　ô　r\＿Ë　　　　　judgments (combination of terms in
A+h+I+0=4　　　^ \　　S^Pform)
prepositional types　　^^ˣ
with 4 modes of
interrelation
REASONING (Argumentation): the building
of propositions into arguments

Figure 6.

Aristotle's categories of possible real existence, viewed now as logical units of discourse. The combining of terms into propositions gave a second level, that of judgment, corresponding to Aristotle's *Peri Hermenias*. Finally, there was the third level of study, the level to which terms and propositions are ordered, namely, the level of reasoning or argument. Here, propositions are combined, just as at the previous level terms were combined, and as at the initial level sounds and concepts were combined to form terms. Any statement of common speech, they held, could in theory be reduced to a series of A, E, I, or Ï (universal affirmative or negative, particular affirmative or negative) propositions. Those propositions have certain necessary relations among themselves (contradiction, contrariety, subcontrariety, subalternation) expressed in the 'square of opposition' — a fairly simple number, that is, of possible logical relations. Finally, the four types of propositions, each admitting of four types of interrelation, gives 16 possible combinations of propositions; and these, multiplied by the four possible arrangements of the three terms (major, minor, middle) comprising an argument (middle term as subject of the major and predicate of the minor, middle term as predicate in both major and minor, middle term as subject in both major and minor, middle term as predicate of major and subject of minor), gives 64 possible combinations of terms and propositions in reasoning. But of those 64 combinations, only 19 prove to be valid when the rules of reasoning are applied — the so-called 'moods' of the syllogism. Only these 19 combinations are valid, that is, internally consistent in the context of natural language. Such, basically, and skating over, needless to say, the thin ice of many controversies,[13] was formal, terminist, or 'summulae' logic as it came to be developed in the Latin universities.

The *Posterior Analytics* was subsumed along with other philosophical matters that logic in the formal sense requires in order to become a tool for the study of real being. This complex of problems came to be called early *material* in contrast to formal logic, later also *major* as opposed to minor (formal or 'summulae') logic. Here the materials of the categories and the *peri hermenias* are covered not in terms solely of their function in discourse ('scientia sermocinalis') but rather now from the standpoint of their (as it were) metaphysical content or aspect, i.e., their relation to real being. So the content of *logica major* or *material logic* came to be regarded as a transition between dialectical studies *(logica minor seu formalis seu summulae)* and philosophical studies proper, namely, the study of the hook-up between the forms of thought and the forms constitutive of the world of physical being. By the 17th century, for example, in the Iberian universities, where the continuity of Latin tradition with the high middle ages remained strongest, 'material logic' would be comprised of a

discussion of the metaphysical side of the problems raised by Porphyry (the problem of universals, the nominalist controversy), so that the *Isagoge* came to be treated as a tract within material logic; a discussion of the applicability of the categories to the world independent of discourse; a discussion of judgment *(peri hermenias)* in terms of, as we would say, its epistemological content or value; and finally, in many ways most importantly of all, the discussion of 'posterior analytics', scientific proof and demonstration.

The following diagram (Figure 7) of the integral course in logic taught in the Faculty of Arts of the major University of Alcala in Spain of the 1630s and 1640s may be regarded as typifying the mainstream Latin development as it took place after the full-scale translations of Aristotle were introduced subsequent to the mid-twelfth century.

(In the early medieval universities, these courses in material and formal logic were distinguished in order of importance by the requirement that the formal course needed to be taken only once, but lectures on the posterior analytics had to be sat through twice — which was their way of emphasizing the greater difficulty and importance of the questions. Today, their *logica major* is no longer recognized generally as logic at all!)

The
Art of Reasoning,
Division:

Prior Analytics —   Posterior Analytics—
Summulae, or   'more useful and
Beginners' Texts   weighty questions'

Doctrinal   '   Exercises   Text of   Texts of
Summaries   Porphyry   Aristotle
                                       ('Isagoge') —
                                       the Problem
                                       of Universals

                                       Categories   On   Posterior
                                                    Interpre-   Analytics
                                                    tation
                                                    (peri
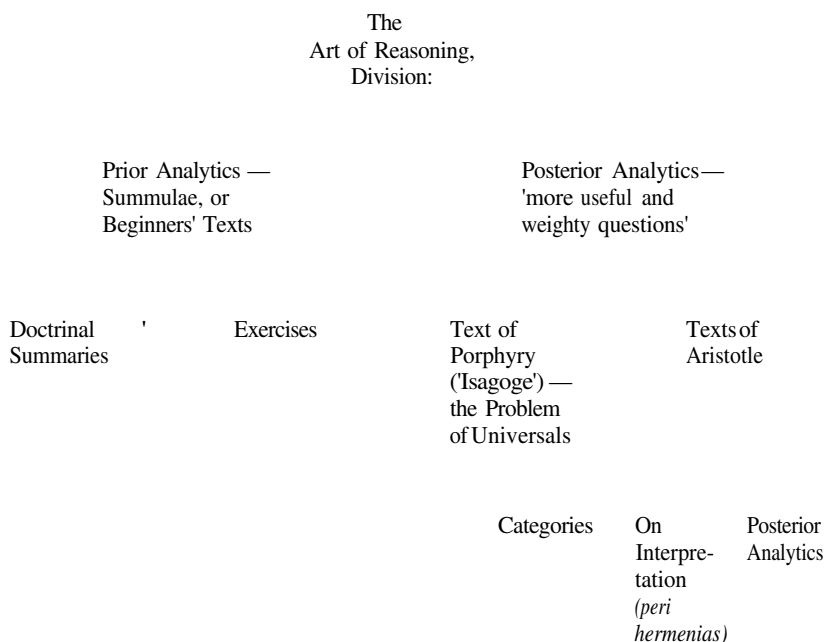   *hermenias)*

Figure 7.

With the form of reasoning and its relation to proofs about what is well in hand, the student would proceed to the study of the natural world in a course of lectures comprising what came to be called everywhere in the Latin renaissance down to the time of Descartes and after 'natural philosophy' — *philosophia naturalis.*

The integration of logical with philosophical studies in the curriculum of the Faculty of Arts of the Latin universities was thus complete, as can be usefully illustrated by the following chart (Figure 8), based on Poinsot (1631-1635), of the entire course of studies in the curriculum of Arts at the University of Alcalä (c. 1630-1650), which gives one a breathtaking view of the scope and rational world-view achieved by the Latin age in the very period of gestation of the more typically 'modem' thought as it would erupt in Descartes and after.

So much for the general view.

Now, specifically with regard to the discussion of signs, already by the time of William of Ockham (d. 1350), the notion of treating ideas as signs within the mind contrasting with spoken words as nature contrasts with convention was becoming an established way of speaking among the logicians. Fragments of such a perspective can also be found in the Latins before Ockham, as indeed in Aristotle himself (cf. *Peri Hermenias,* 16a3-8[14]). But this was not at the time of transition between medieval and renaissance times a characteristic way of speaking, whose presuppositions and consequences had been well explored. On the contrary, we encounter such references in the 13th and 14th centuries in truncated contexts that make them seem inevitable, but underdeveloped.
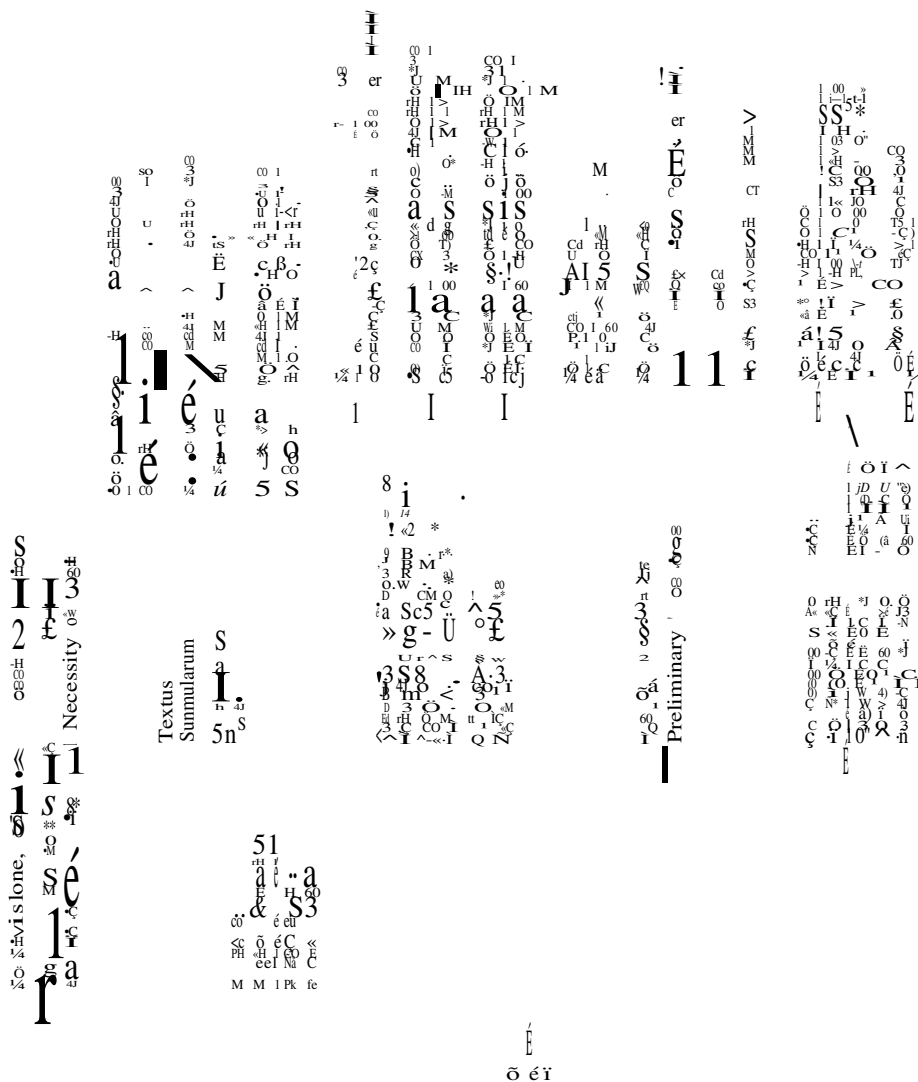
The study of ideas (for which their main less technical word, along with several others, was 'concept'), was assigned in their culture not to Logic but to the life sciences, as we call them, and particularly to the *de anima* or 'psychology', which was for them a science coextensive with the in-vestigation of living things. 'Psychology', for the Latins, insofar as it concerned itself with the formation and function of concepts, meant zoosemiotics just as much as it did anthroposemiotics — a point that tends to get lost after Descartes. Here, in the psychology, the culmination of the whole curriculum of philosophy was reached in the study of the problems of cognition and concept-formation, as can be seen from our chart above.

In their psychobiology, ideas (concepts) were studied as the forms of knowing — literally, the structures of the contents of awareness — common to human and nonhuman animals in many respects, unique to men in other respects, namely, in the domain of reason proper or intellectual understanding (including logic). At some risk of oversimplifi-cation, it can be said that in the analysis of the medieval and renaissance
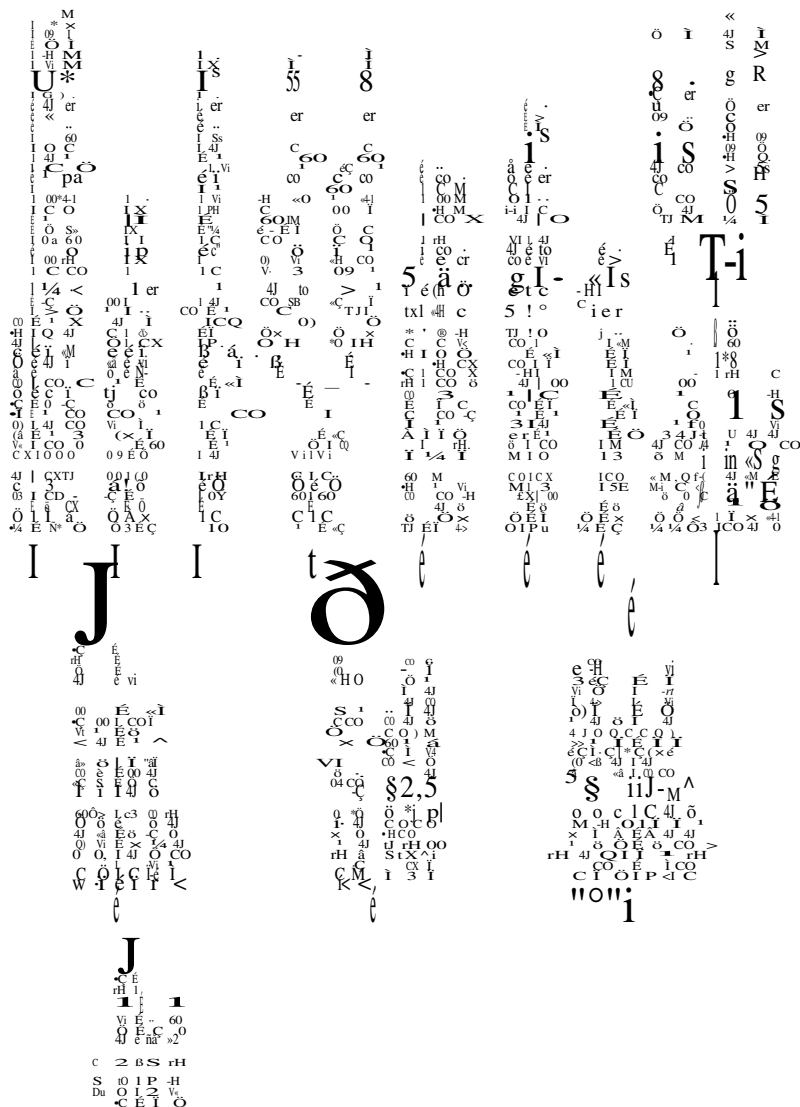
j

II   *

,É,   ᵝÂÂ

•ᴴ ᵀᴶ
^ᴵᴵᴵᴵ 5 i * ᵒ
§î ˙ laša8
s^
  ɪˑ, ᶻ ᵒ
    ä ^

§l
ᴹ ɪ н

⁴ ¹ ᴹ ¹
L

Textus
Summularum

Necessity

Preliminary

vis Ione,

Figure 8a.

Figure 8b.

penes partes quae⌖⌖ ⌖ Physicorum)

to the FirstMove⌖
secundariorum movⲞ⸲
ad primum movens
of Secondary Mov⌖
First Mover: q. X⌖
instrumentaliter a⌖
principaliter movⲞ⸲
of Instrumental
Causes: q. XXVI.

IOI, ÇO: ifift·

Figure 8c.

Figure 8d.

Formally: Linguistic Signs

Dependent (ëïãïä)

"Materially," i.e.,   ut cognitum;
Signs as Such, or SEMIOTICA
(Foundations)

÷ ProcBmium: Its Object
  Unity, and Origin
  (de Primo Cogmitto)

Principles of Ttaings
(Substances Pnresent-a

General
Considerations

Principles of Uraderst

The Proper Subjectivi
of Experimental Being
Temporal Change in Ma

/ Terrestrial,
  i.e., Sublunary
  (Planetary
  Phenomena):
  PHILOSOPHIA
  NATURALIS

and
Mind-Independei ●Ë
or "Natural"
(öõóé?)

Specialized Physical Systems,
"Biology" Adequately Considered.
BIOSEMIOTICS, the Study of
Animate (Living) Bodies:
Plant and Animal Life

Celestial or Astronomical Phenomena, i.e., the Spheres
beyond the Moon: Suppressed (or abandoned) In the
year of Galileo's condemnation, 1634 (cf. fragments
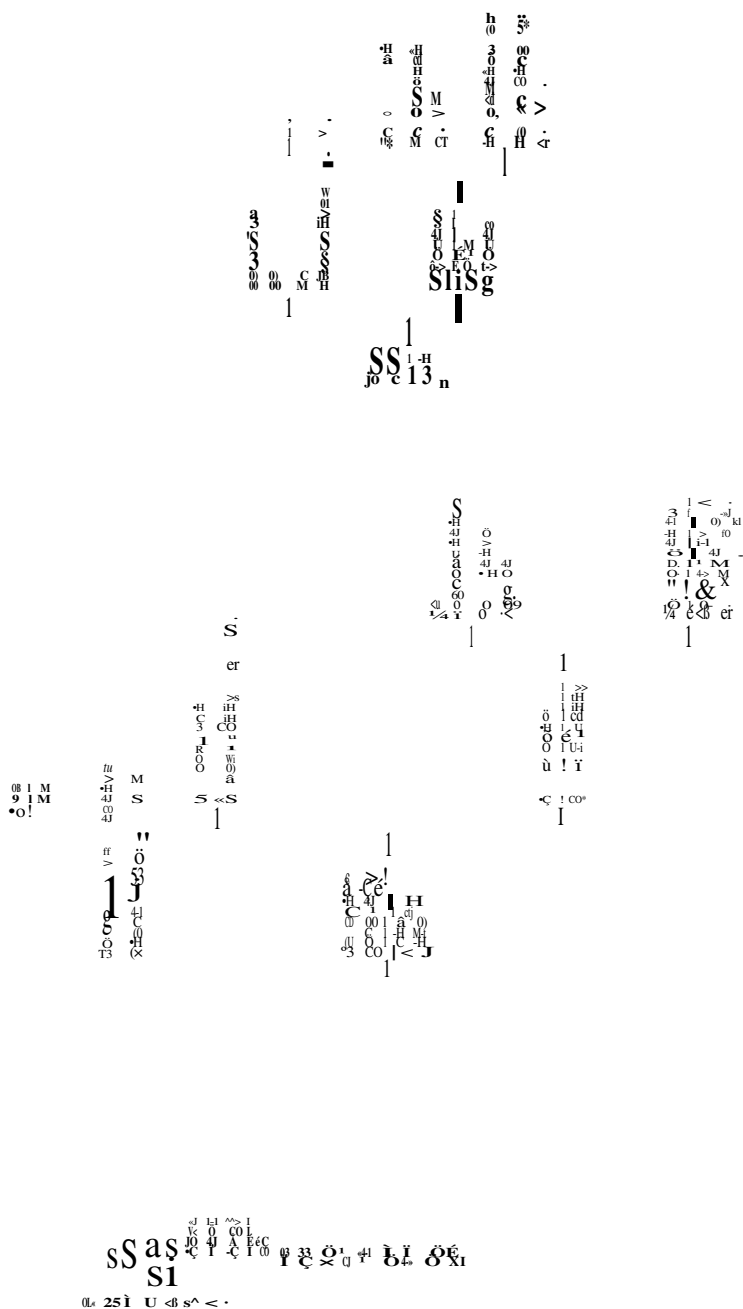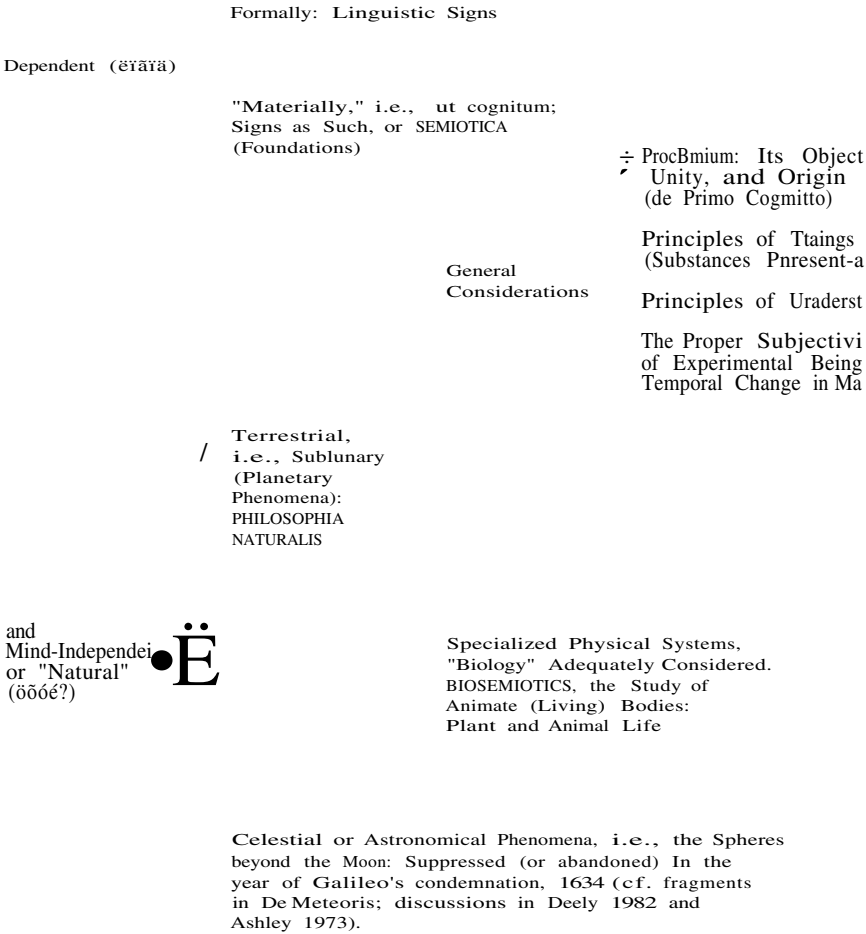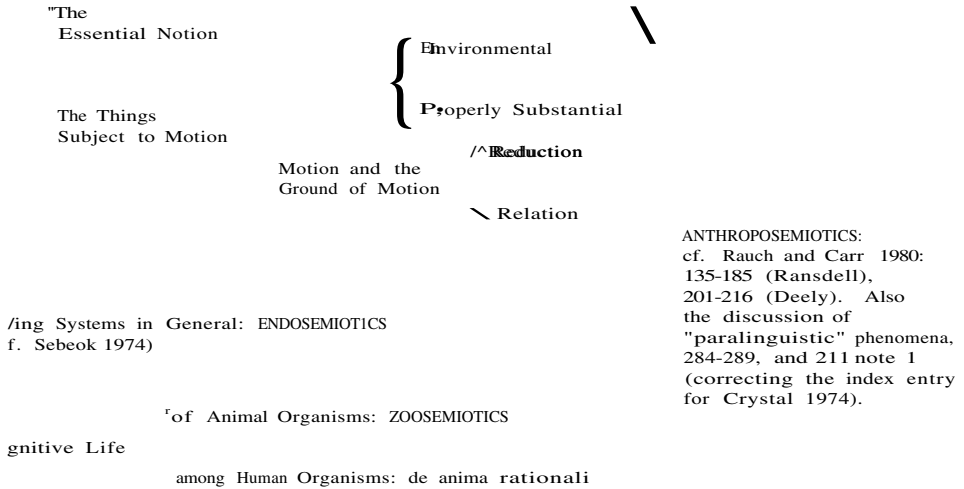in De Meteoris; discussions in Deely 1982 and
Ashley 1973).

Figure 8e.   *Semiotic condensation of Figure 8, A-D.*

philosophical mainstream, ideas are seen as the specific and irreducibly cognitive response of the organism to stimuli impinging upon it from the physical environment. As a response to the environment, ideas structure the world as it appears or will appear to the individual organism, first of all in terms of circumstances to be sought and circumstances to be avoided — the basic opposition of friendly and hostile. Ideas then for them were first of all what the organism expressed to itself as important (helpful or harmful, pleasant or unpleasant, to be sought or avoided) in its encounters with the real being of the physical world.

"The
Essential Notion

{ Environmental

Properly Substantial

/^Reduction

The Things
Subject to Motion

Motion and the
Ground of Motion

\ Relation

/ing Systems in General: ENDOSEMIOTICS
f. Sebeok 1974)

⌐of Animal Organisms: ZOOSEMIOTICS

gnitive Life

among Human Organisms: de anima rationali

Viewing them precisely as such, that is, as objective self-expressions of cognitive life, the Latins called concepts by a name they took over from the Greek, one which, as Maritain has noted (1959: 115), 'has no equivalent in our modern languages', namely, *species* (pronounced 'spay-chee-ehs') *expressae* — 'expressed species', a term *(species)* that can also be translated as *form,* a form expressed by the mind in response to an environmental stimulus (see Figure 9). Psychology, thus — Aristotelian psychology, really a psychobiology — added to the natural forms of Aristotelian physics a notion of specifically and irreducibly cognitive
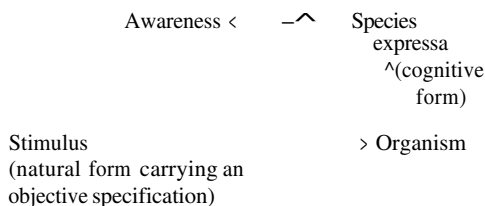
Awareness ‹   –⌃   Species
expressa
^(cognitive
form)

Stimulus   › Organism
(natural form carrying an
objective specification)

Figure 9.

forms, the *species,* or, as they also came generally to be called among the later Latins, apparently under the influence of the commentaries of Averroes (d. 1198) on the *De Anima, intentional* forms.

The 'forms' by which things exist in nature independently of awareness would be natural forms; but the forms that these same things have in our thought and experience of them would be cognitive or intentional forms, i.e., *species expressae.* I have introduced here this understanding of *species expressa,* because it was in the Latin vocabulary perhaps the most generic technical term for what Locke and the moderns after him called simply ideas:

An Essay Concerning Human Understanding (Locke), 1690: introductory par. 8, *What 'Idea' stands for.* Thus much I thought necessary to say concerning the occasion of this Inquiry into human Understanding. But, before I proceed on to what I have thought on this subject, I must here in the entrance beg pardon of my reader for the frequent use of the word *idea,* which he will find in the following treatise. It being that term which, I think, serves best to stand for whatsoever is the *object* of the understanding when a man thinks, I have used it to express whatever is meant *by phantasm, notion, species,* or *whatever it is which the mind can be employed about in thinking',* and I could not avoid frequently using it.

That generic use of 'idea' for what the imagination, memory, or reason indifferently produce in order to know corresponds in Latin philosophy to the notion of 'species expressa.' Several other terms have to be added in nuancing the generic notion, reflecting the complexity of the Latin Aristotelian analysis of cognition. From a certain point of view, particularly as they occurred at the level of perceptual awareness, then *species expressae* were also called *images (imago);* as providing the raw material of intellection they were called *phantasms (phantasma);* as establishing an immediate awareness of objects they were called 'notices' *(notitia);* as constituting a realm apart from the real they were called *representations (repraesentatio)* and *icons (idolum)* as precise effects proportioned objec-

lively to the natural forms of environmental stimuli they were called *similitudes (similitudo)',* and so on.

But the extension to these forms — the cognitive or intentional forms — of the notion *of sign,* although found here and there throughout the Latin writings, is only as it were by the way and as a second thought, and by analogy to the signs of oral communication, especially speech (words), and of nature, as clouds signifying rain.

The possibility of a semiotic analysis of concepts, that is to say, the possibility of an analysis of the being proper to concepts considered precisely as signs, was only beginning to be sensed and probed here and there, it seems, in the time of transition within Latin culture between medieval and renaissance times, but without gaining any clarity as to its consequences and implications not only for logic itself, but also for the life sciences and psychology by which the Latins generally developed a theory of knowledge entirely from a point of view that we would characterize in retrospect as ontological, or even metaphysical, rather than epistemological. The question of a general treatise on signs seems never to have been raised at this period, nor would it be, as we shall see, until the end of the Latin age.

The historical unit of focus for further research into the original coalescence of a thematically semiotic consciousness, I would suggest, should be the period between 1350 and 1650. I choose these dates not arbitrarily, but because they represent the death of the last seriously studied figure of mainstream Latin development, practically speaking, namely, William of Ockham, and the death of the first seriously studied post-Latin mainstream thinker, namely, Descartes. Such is the sorry state of research into the history of philosophy in the contemporary period that this interlude is *terra incognita,* astonishingly enough, the 'least known period in the history of Western philosophy' (Randall 1962: vii-viii) — a situation quite detrimental for the development of semiotics, as very recent studies (e.g., Herculano de Carvalho 1969; Romeo 1979) have begun to make clear. The common prejudice, established in the century after Descartes and prevailing down to the present day, is stated with perfect clarity by Charles Sanders Peirce (1871: 14):

With Ockham, who died in 1347, scholasticism may be said to have culminated. After him the scholastic philosophy showed a tendency to separate itself from the religious element which alone could dignify it, and sunk first into extreme formalism and fandfulness, and then into the merited contempt of all men.

Professor Savan has observed in discussing this remark that Peirce made it at a very young age, and that a man so young, breathing the air of the

age, should perhaps not be held too strictly to account for so gross and fallacious a generalization. With this I am inclined to agree, particularly when one considers how extraordinarily at variance Peirce's thought stands in its totality with the complacent contemporaneity with which philosophers today, as in Peirce's time, continuing the Cartesian heritage as though the intervening centuries had revealed nothing of its limitations, shamelessly indulge what Levy-Bruhl once described (1899: ix) as 'a taste for abstract and too simple solutions, a conviction that it is sufficient to argue soundly upon evident principles in order to discover the truth, even in the most complex problems of social life — in short, a lack of historical spirit', an almost total naivete regarding the historicity of man. Nonetheless, in that early statement, Peirce truly represents the prevailing prejudice at the turn of the century which endures, although it has most recently begun to be qualified and the period which it has consigned to oblivion may soon (let us hope) be invaded by intellectual explorers who will bring its true character and riches into the light of day. In this regard, Gilson (1952: 657), speaking of course of Latin philosophy after Ockham, well remarked: 'We enter here upon a doctrinal territory ill understood, extremely complex and of which we know at least this much going in, namely, that the term "nominalism"', a term long used to characterize the totality of post-Ockhamite scholasticism, 'does not in any wise suffice to define it.' Kristeller, whose work has gone further in this area than that of any other toward undermining the ignorant prejudices that have shrouded the early Latin phase of modern thought in myths and caricatures, suggests summarily how the present situation came about. 'Historians of thought', he remarks (1961a: 34), 'have been sympathetic to the opponents of Aristotelianism in the Renaissance, whereas most of the defenders of medieval philosophy have limited their efforts to its earlier phases before the end of the thirteenth century, and have sacrificed the late scholastics to the critique of their contemporary and modern adversaries.'

The situation that confronts us here may be described as follows (Kristeller 1961b: *114-116 passim).*

... Renaissance Aristotelianism continued the medieval scholastic tradition without any visible break. It preserved a firm hold on the university chairs of logic, natural philosophy, and metaphysics, whereas even the humanist professors of moral philosophy continued, to base their lectures on Aristotle. The literary activity of these Aristotelian philosophers ... is difficult of access and arduous to read, but rich in philosophical problems and doctrine. It represents the bulk and kernel of the philosophical thought of the period, but it has been badly neglected by modern historians. ... Consequently, most modern scholars have condemned the Aristotelian philosophers of the Renaissance without a hearing. ... If we want

to judge the merits and limitations of Renaissance Aristotelianism we will have to proceed to a new direct investigation of the source materials, instead of repeating antiquated judgments

—such as the one enunciated by Peirce in 1871. We should note here, as the above passage from Kristeller already suggests, how little useful for our purposes is the division which standard historiography makes into 'early 0Frühscholastik' — 1050-1200), 'high' ('Hochscholastik' — 1200-1300), and 'late' ('Spätscholastik' — after 1300) scholasticism. This division, especially as between 'high' and 'late' Latin philosophy, and particularly if we look to the lines of development linking the Paris of Thomas Aquinas with the Iberian schools at Coimbra, Salamanca, Alcala, and elsewhere, is arbitrary to a fault, chronological in the thinnest sense. The truth is that there is no name or place in the currently con-ventionalized 'history of philosophy' for the epoch of *philosophia naturalis* that begins with the twelfth-century translations of Aristotle and cul-minates in the curricula of the seventeenth-century Spanish schools.

  The translation of the works of Aristotle in the twelfth century coincided within about 70 years with the founding of the European universities, as they continue to this day. If you have ever looked at the contents of the entire works of Aristotle, you know that they comprise in their own way practically the whole range of academic studies down to this day. What the contents of the works of Aristotle became in those early times, therefore, was, not surprisingly, the university curriculum of the West throughout the later Latin age. By comparison, the developments of humanism (literary humanism, not the secular and philosophical hu-manism meant by the term today) and of Platonism in the renaissance were something beside or sustained within this mainstream. After Descartes, where today a graduate student's continuous historical know-ledge of philosophy typically ends (when it even goes back that far), 'everyone knows' that those earlier Latin Aristotelians were victims of idle speculation, having nothing worthwhile to say to later ages. So why study them? Almost any professor of philosophy in the mainstream departments of universities in the English-speaking world can tell you that, without even having to look at the books of the period.

  On the other side, even when the great revival of medieval studies took place, largely, in the 'English-speaking world', due to the great and recently deceased Gilson, the new interest in Latin philosophy only carried its workers up to the time of Ockham, usually to limn in him the clear beginnings of a 'decadence' that would only advance in the remaining Latin ages (a view indeed not wholly wrong as far as education in the English universities was concerned!), but sometimes to champion him

rather as the last outpost of Latin greatness in philosophy, as in the work of Boehner.[15] Thus, from both sides — whether one deals with the historians of the middle ages moving toward the present, or with the contemporary philosophers so far as they see themselves as heir to a historical tradition — a point is reached, Ockham in the former case, Descartes in the latter, where there is simply a gap, populated it is true by a few odd figures like Nicolas of Cusa, Marsilio Ficino, and Pomponazzi; but basically the period in question is a big black hole. Yet precisely in that 'black hole', there is good reason to suspect, lies the richest and most fertile ground for understanding the epigenic unfolding in our own times of a semiotic point of view. Historically, I would suggest this is precisely the principal gestation period for the development historically of the semiotic point of view.

First of all, not only from the point of view of philosophy proper, as we have seen, but particularly from the point of view of semiotic, this period (1350-1650) does not at all develop along those lines of vision that are familiar in the standard histories, which tend to concentrate on the renaissance in Europe and the Italian peninsula, and on figures that are identified either with the humanist movement, or with Platonic movements that were indigenous to the renaissance with its newly awakened sensitivity to and interest in linguistic diversity which, as much as anything, sets the renaissance apart from the earlier 'Middle Ages'.

The recovery of Greek and awakening awareness of the feedback effect of language on underlying structures of thought and experience are events of first importance to the gestation of semiotics. Initially, apart from ecclesiastical concerns with Orthodoxy', scholars were delighted at the great find made available by the early translations of Aristotle. But as time went on, particularly as scholars fleeing Constantinople made Greek more and more accessible to the Latin West, further translations of the same works were made, with the semantic fields distributed often in troublingly alternative ways on key points 'settled' in earlier commentaries. Two or three hundred years of such endeavor, needless to say, created a situation of some considerable complexity.

From the point of view of semiotic, the crucial lines of development over the period in question seem to lie in the university traditions of Iberia, Spain, and Portugal. These university traditions, as we have said, are continuous substantially with the doctrinal achievements of the high middle ages, particularly in the three great centers already mentioned, namely, Coimbra, the principal university of Portugal, Salamanca, the principal center in Spain, and Alcalä, rival to Salamanca for a time in the late sixteenth and early seventeenth centuries. In these and related schools, dispute over signs and signification was rampant — 'a matter of daily

dispute in the schools', as one author of the period put it (Poinsot 1632: 680a38-39 — 'quotidianis disputationibus agitare solent').

Within the summulist logical tradition therefore, or at least within the Iberian university world, there is a considerable development of controversies over signification during the period we have circumscribed. The possibility of a unified science or doctrine or 'theory', of abstracting, as it were, a *common object* in the experience of signification, was, by the end of the sixteenth century, a matter on which sides were being taken, often against, as in the case of the celebrated Suarez (1605: disp. 1, par. 6).

How central semiotic notions were becoming in the thought of this period can be indicated best, perhaps, by the case of Petrus Fonsecus (1528-1599), a Portuguese philosopher who became the principal professor at Coimbra and the organizing force of the group of thinkers there whose work came to be known collectively as the *Cursus Conimbricensis.* Of particular interest for our study was the publication in 1564 of his *Institutionum dialecticarum libri octo,* essentially a summulist logic text, which was read far and wide in the Latin world, having gone through some 53 editions by the year 1624 (Romeo 1979: 190).

In Pedro's work, already we find a special terminology, adding to the traditional ontological epistemological analysis of knowledge not just another set of terms for dealing with the, as we have seen, already complex notion of 'ideas' *(conceptus),* but a set of terms specifically designed to assimilate the entire prejacent analysis as developed from the point of view of ontology to the quite different point of view of signification, or, as we could say, *semiosis.* Signs were divided, in this new way of speaking and thinking, into 'formal' and 'instrumental', the former being the 'forms' *(species expressae)* or ideas within the mind whereby experience is structured, the latter being words and, more generally, any sense-perceptible item or object of experience which functions as a sign, i.e., to bring something else into awareness. In Pedro's own words (1564: 1. I, cap. VIII):

Formal signs are similitudes or certain forms *(species)* of things signified inscribed within the cognitive powers, by means of which the things signified are perceived. Of this sort is the similitude which the spectacle of a mountain impresses upon the eyes, or the image which an absent friend leaves in another's memory, or again the picture one forms of something which he has never seen. These signs are called 'formal', because they form and as it were structure the knowing power.

Instrumental signs are those which, having become objects for knowing powers, lead to the cognition of something else. Of this sort is the track of an animal left in the ground, smoke, a statue, and the like. For a track is a sign of the animal which made it: smoke the sign of an unseen fire: a statue finally is a sign of Caesar or someone else. These signs are called Instrumental,' either because through them as

instruments we signify to others our ideas; or because just as an artist must move his instrument in order to shape his material with it, so must powers able to know first perceive these signs in order to know anything through them.

Hence may be gathered the most striking difference between instrumental and formal signs: since indeed formal signs do not have to be perceived by us in order for us to come to an awareness of the thing signified by the perception they structure; but unless instrumental signs are perceived, they lead no one to an awareness of anything.[16]

It seems probable that this division, apparently indigenous to our neglected period, was drawn specifically in light of a growing uneasiness with the long-accepted definition of Augustine (c. 397-426: 1. II, c.l) taken over in the *Sentences* of Peter Lombard (c. 1150) and thereafter by all of the Latin writers on sacramental theology, according to which definition being sense-perceptible was essential to the proper being of a sign. By Fonseca's time, as already in Ockham's forthright designation of ideas in the mind as *signa naturalia,* it was becoming evident that the concepts of the mind, being as we have seen the very structures which form our experience of nature, indeed function as sense-perceptible signs function insofar as these latter function *as* signs, yet without being for all that in anywise accessible to sense perception as such. Moreover, not only concepts were designated by the Latins as *signa naturalia,* but all those phenomena of human experience which seem to have a connection with what they signify antecedent to and independent of social interaction. For these and other reasons, the need began to be felt for a new way of thinking about signs, and the new division of signs into formal and instrumental appears to have been the most seminal coinage within the period to accommodate this need, as can be seen in the lecture course given by Professor Bosserei at the University of Graz, Austria, in 1615 (MS 133 of the University), on the logical doctrines of Fonseca *(Synopses in quibus doctrina dialectica R.' P.' Petri Fonseca ad ordinem Aristotelicam revocatur),* at the point where Bosserei synthesizes Fonseca's discussion of signs in the *Institutiones* of 1564:

To signify means to represent something to a being able to know, as, for example, to the sense, the imagination, the understanding. Signs are divided into two groups. The first comprises formal and instrumental signs. The formal ones are similitudes, like images of things signified that exist in cognitive powers, through which the things signified are apprehended, as, for example, the resemblance of a friend. In order that these signs may be known, it is not necessary to see the eyes through which one sees the signs. Instrumental signs are those which are representedUo cognitive powers as soon as they are recognized by them, and also when they lead to the recognition of other things, as the footprint of an animal, smoke, or wrinkles in the forehead.

The second group contains natural and conventional signs. Natural signs are those which signify the same thing to everybody, such as moans and laughs. Conventional signs are those which signify through as it were a socially structured human intention, such as words and letters, as well as those which have entered the usage of all people, such as 'ivy' and 'cypress.'

Note that natural signs can also be formal, but not all of them, in fact, a concept and a moan are natural; a moan however is not formal, but instrumental.[17]

Whether the division of signs based on their function in experience relative to the cognizing organism, with the revision of the classical Augustinian definition that the new division implies (by restricting it to the one class of instrumental signs only), was original with Fonseca or suggested to him by earlier writers I cannot say at present. The parenthetical remark, 'liceat enim ita loqui', immediately following Fonseca's own introduction of the division into his text (1564: 1. I, cap. VIII), taken together with the reservations he gives about this way of speaking ('priora ilia' — seil., *signa formalia* — 'nee admodum usitate nominantur signa, nee satis proprie dicuntur repraesentare: haec vero posteriora' — seil., *signa instrumentalia* — 'maxime'), and his attempt finally to soften the criticism of St. Augustine's proposed definition that the new perspective implies ('Unde D. Augustinus quasi complexus omnia, quae populari sermone signa dicerentur, hoc modo signum definivit: Signum est, quod et seipsum sensui, et praeter se aliquid animo ostendit'), would seem to suggest strongly that the division is not Fonseca's own, but that he is rather reacting to and attempting to assimilate to his own more conservative thought (remember his criticism of the summulist tradition for departing too far from the reading of Aristotle, in note 11 above) elements that have already been introduced into the summulist tradition by others before him.

Of immediate importance, however, is not the question of authorship, but the fact of the new, specialized terminology insofar as it attests to a new, unmistakable direction — the direction of semiotics — in which the late Latin renaissance mainstream in its most vigorous current was unmistakably moving.

In line with this development, we find in Fonseca also an explicit attempt to identify the precise role of representation in signification (1564: 1. I, cap. VIII):

To signify is nothing else than to represent something to a cognizing power. But since everything that represents something is a sign of the thing which it represents, it happens that whatever signifies something is its sign.[18]

And as this text shows, for Fonseca, the relation of representation to signification is one of identity, one wherein the two are equated.

But thirdly, we find in Fonseca, as a consequence of his reservations concerning the notion of formal 'signs' noted above — namely, that [fr]they are not called signs in full accordance with the customary usage' ('nee admodum usitate nominantur signa'), that is, that established by Augustine; [4]nor are they said to represent with sufficient propriety' ('nee satis proprie dicuntur representare') — and this goes *against* the line of development otherwise indicated thus far, a specific denial that there is really a common notion that unites these two kinds of signs. This in effect is a denial of a unified object at the base of semiotic analysis, and hence of the possibility of a general account, theory, or doctrine of signs. In other words, we find in Fonseca a man pressured by the development of thought and terminology in the summulist tradition to envisage the specific possibility of a semiotic, but he resists the prospect and in the end denies it. The possibility, he says in effect, is not a real one, in this anticipating the view of the major Latin professor who would almost alone influence the specifically modern thinkers of the seventeenth century such as Descartes and Leibniz, who in turn would set the direction of mainstream philosophical development in the national language traditions. I refer of course to the magistral Francis Suarez, already mentioned above (1605: disp. 1, par. 6; cf. Poinsot 1632: 658b30-659a39), who has found in our own time an unknowing disciple and unwitting echo in Roger Scruton's denial (1980: 14) that clouds signify rain in any sense univocal with the way that words signify.

Fourthly, therefore, we find in Fonseca, contrary to the obvious sense of his own words, and again *contrary* to the semiotic development he otherwise furthers in spite of himself, an effort to promote continued acceptance of St. Augustine's definition of the sign as a correct general definition, that is valid for all cases — the definition, it will be remembered, from the *De doctrina Christiana: ¢* sign is something which, on being perceived, brings something other than itself into awareness.' This definition obviously applies to instrumental signs — sense-perceptible realities which function subsequently as signs; so, if it is truly a general definition of signs, then indeed the possibility of treating ideas in semiotic perspective is precluded.

But, finally, to return to a positive point, we also find at this period, clearly illustrated in Fonseca's work, proof of a developing sophistication in the understanding of the distinction between natural and conventional signs, as involving in fact more than two terms. This is a point of considerable theoretical importance, as I have tried to show elsewhere (1978a). Here, I want only to note its active presence in the summulist currents of the Latin renaissance (Fonseca 1564: 1. I, cap. IX):

Conventional signs are those which signify by deliberate intention and as if by a kind of compact. Such signs are of two types, for some signify as the result of stipulations, such as the words by which men converse, or the letters by which absent parties communicate; others however signify as the result of customs and traditions of use, in the way that items displayed in a shop signify what is for sale. And of those signs which signify by stipulation, there is again a twofold signification, proper and improper. ... Indeed practically all words have an improper signification as a result of adaptation and change in use, through metaphor, catachresis, metalepsis, or metonymy.[19]

What is clear then at this point — roughly two-thirds of the way through our 'lost period' in the history of philosophy and semiotic — is that there is a growing complexity of considerable interest and not without its antinomies in the understanding of signs. The definition of sign is becoming unsettled, the division of signs is ramifying and intersecting in unexpected ways that demand further analysis and, in particular, have consequences for the very attempt at definition.

The first thinker that we encounter who both debates the possibility of a unified doctrine or 'general theory' of signs and affirms it unequivocally, setting himself to work out precisely such a doctrine in a unified treatise, is a Spanish philosopher (Deely 1982: H.A. and note 31) whose mother's name was Garcez (Portuguese) and whose father's name was Poinsot (Burgundian). He published an introductory logic text called *Summulae* in 1631, the year before Locke's birth. He preceded his *textus summularum* with a very interesting announcement of his own forthcoming *Treatise on Signs,* to be published in the following year as part of the course in material logic; and with an equally interesting complaint. The introductory logic texts that have been written in recent generations have become excessively complicated, he asserts, through the intrusion into the introduction of the problems attendant upon the notion of sign, which involves many matters from metaphysics and psychology which are customarily treated at length only toward the end of the curriculum (see Figure 8 above) — the whole problem of knowledge and ideas; with the result that beginners have experienced needless and excessive difficulty in getting clear about the more simple business (exclusively language-related) of formal logic as traditionally conceived, a *scientia sermocinalis* (in contrast with signs as such, which are coextensive with the whole of cognitive life, perceptual as well as conceptual, pre- and postlinguistic).

Therefore, he says, what he has done, in order to simplify the *summulae* texts and at the same time clarify the larger logical and philosophical tradition in this area, is to reduce to their proper unity all the basic issues which have been raised concerning signs, and insert the discussion of these issues into its proper place in the tradition of logic and philosophy, by

substituting a general treatise on signs *(tractatus de signis)* for the heretofore customary commentary on the *De Interpretation? ((Peri Hermenias)* of Aristotle. Because, he continues elsewhere (1632: 'Sniper libros perihermenias', 642al-644bl5), in the logical tradition up till mow, e.g., in the commentary of St. Thomas (c. 1269-1272) on the *Peri Hermenias* or in its completion by Cajetan (1496), or in the writings of the other Latins on the subject all the way down to the seventeenth centtury, *interpretation,* following Aristotle, has been treated solely in terms of intellectual or *logical* interpretation; but logical interpretation itself is «only one mode or form of interpretation; interpretation as such is rather coextensive with the cognitive life of organisms; and logic achieves its specific forms of interpretation already only through the use of signs. And therefore, lest the foundations of the exposition of logical form go unexamined, it is necessary to substitute for the narrow logical discussion of interpretation customary in the second part of Logic (i.e., in the problematic of'material' logic) rather a general treatise on signs, which is what the name 'perihermenias' properly would mean.

In 1632, the year of Locke's birth, Poinsot's *Treatise* proper was published. This is not the place to examine this so far as we presently know first systematic semiotic treatise in all the detail of its subtle and far-reaching exposition. It will suffice for present purposes, particularly against the background of Fonseca's work, with which Poinsot, being himself a graduate of Coimbra (1605), was thoroughly familiar, to discuss three points of basic theoretical importance.

First of all, the critique of the definition of the sign handed down by all the Latin generations from Augustine, implicit in the introduction of the division of signs into formal and instrumental, as we have seen, but hedged by Fonseca, is on the contrary made explicit and championed by Poinsot (1631: 10a6-12; 1632: 646a 14-28). The ground of this critique, as of the existence of a unified subject matter for semiotic, is the insight that what is essential in our experience to the being and functioning of a sign is not that it be something perceived but that it bring something other than itself into the awareness oif an organism, which is exactly how ideas function within the mind — to bring something other than themselves into awareness. When you think of a horse, for example, it is the horse you are thinking of, a determinate object, not the subjective mental state, the idea in your mind, that objective presence presupposes. The consequence of this is that formal and instrumental signs, precisely as signs, are indeed univocal in their way of being, and are therefore equally truly signs; this is the crucial point of doctrine that Poinsot establishes from a number of angles (e.g., 1632: Book I, Questions 1 and 2; Question 5 at 684b 10-42) before tackling it *exprofesso* in the opening Question of Book II, 'Whether

the Division of Signs into Formal and Instrumental Is Univocal and Exhaustive'.

Secondly, Poinsot expressly denies the equation explicit in Fonseca and implicit in most writers on signs down to the present day between *representation* and *signification* (1631: 9b30-41; 1632: 646a29-bl5, 649al l-b36). Representation and signification differ in this: an object can represent another than itself, and thus be a sign, but an object can also represent itself; whereas it is a contradiction for a sign to be a sign of itself: a sign is a sign only if it is a sign of something at least modally other.

Poinsot explains this in terms of the account of relation traditional in Latin thought from the time of Boethius. According to this tradition, relation involves three basic elements: what they called the foundation, or *ground,* in our terms — some characteristic of an individual; the relation itself, which is over and above the individual — supra- and inter-subjective, we would say; and that *to which* the thing is related through its foundation, which they called the term or *terminus* of the relation. In terms of signs, what Poinsot is saying is that the sign — signification — consists in the relation, the second of the three elements. Representation at best is *the foundation* for the relations of signification. So apparently for the first time, Poinsot establishes a systematic distinction between signification and representation, where the role of representation is isolated and identified within signification. All signs, thus, involve representation, but not all representations are signs *(pace* Fonseca).

As an aside, in order to glimpse in passing the theoretical importance of this point, recall how Locke begins his *Essay Concerning Human Understanding* with the notion of ideas as directly apprehended representations of objects. At the conclusion of his *Essay,* when calling for a semiotic analysis of ideas, he suggests that such an analysis will perhaps result in a different sort of Logic and critic than we have been acquainted with hitherto. What Poinsot shows in the coarse of his treatise is that when indeed ideas are analyzed as signs, it is impossible for them to be the direct objects of our awareness in the sense that Locke lays down at the beginning of his *Essay* (Introduction, par. 8). Viewed in this light, Poinsot's semiotic appears historically as an alternative epistemology to the solipsistic course that modern thought actually takes in the national language traditions (further in Deely 1978b: 163-166; 1978c).

Thirdly, our author in some sense sees that an essential feature of semiotic analysis *('doctrina signorum* in his terms) is that it is a new beginning for the whole enterprise of philosophy. For one thing, it entails a new analysis of experience that subsumes what were previously the last conclusions of the system within its experiential starting point (Deely 1982: LB.). For another, the analysis of sign — semiotic — provides a

point of view that is superior to, that literally transcends, the traditional division of being into what is independent of the mind *(ens reale)* and what is dependent upon it *(ens rationis),* because in the sign, as in experience, both orders of being are found (Poinsot 1632: 646b25-33). When clouds, through our experience, come to function as signs of rain, we have a natural sign; but of course, in some culture, clouds might also function as signs of a particular relationship to the gods, which is to us obviously not a question of something natural. Social and natural being come together in the sign.

Compare this last point to Locke's notion of semiotic, as put forward in 1690. In concluding his *Essay,* Locke proposes his new division of knowledge, which we may schematize as in Figure 10.

This proposed division is reminiscent in different ways both of Aristotle's division of the sciences and of the old Stoic division introduced earlier, but with a very important difference which I failed to notice before in another treatment of this matter (Deely 1978b: 152-154). Notice that in the Stoic division, as also in that of Aristotle, the various types of objects specifying the various types of knowledge are distinguished, and they are kept distinct. Locke divides knowledge at first exactly the way Aristotle does — essentially he divides it into *speculative* (the knowledge of things which are what they are, independently of us, which Locke calls *physics,* betraying not only a Greek influence but, much more proximately, the

KNOWLEDGE

SPECULATIVE —
of things which
are what they
are by nature

PRACTICAL —
of things which
are what they
are owing to
human thought or
action

SEMIOTIC — of the
means whereby specu-
lative and practical
knowledge alike is
acquired, elaborated,
and shared

Figure 10.

influence of the Latin renaissance) and *practical* (that is, the knowledge of things which depend for their coming into existence upon human thought and action). So far he is merely repeating Aristotle. But now, when he brings in his semiotic, what we are confronted with is a proposal for studying in a systematic and unified fashion the ways and means whereby speculative and practical knowledge alike are acquired, developed, and communicated. This establishes a threefold division of the sciences, certainly, but it is more unlike than it is like the division either of the Stoics or of Aristotle; because with Locke's third branch we are given a *distinction which unites:* it distinguishes the different orders only in order to show how they are brought together in the sign — and this is exactly the point of view superior to the division of being into *ens reale* (the object of speculative thought in the Aristotelian tradition) and *ens rationis* (certain forms of which are the object of practical thought) that we already encountered as the entrance to Poinsot's *doctrina signorum.* The object of semiotic is neither *ens reale nor ens rationis* preclusively, but both in the ways they get mixed up with and compenetrate one another in experience.

What is being drawn here, by Poinsot, by Locke, by — more fundamentally— semiotic — is a new line: in the old tradition, the basic concern is with what is what it is independently of human thought and action, and secondarily with the things that are brought about by and depend upon man. With semiotic, the basic concern is with both equally, and the basic realization is that 'what is' is circumscribed not by a fixed but by a shifting line whose shifts are determined precisely by the interaction between the two orders of being through the function of signs, through semiosis. The study of that shifting reality, that shifting line, is semiotic. Clouds as signs of rain is the classical case of the natural sign as something which is what it is independent of man. Now of course there are people trying to seed the clouds to produce rain, bringing what was formerly wholly outside human control now partly within that control — hardly a possibility the medievals envisaged.

The older divisions separated the various orders of knowledge, the 'sciences'. This division shows how they are united in human experience. We may schematize the relation of knowledge to experience on this basis as shown in Figure 11.

It is with Poinsot, we may say, that the long tradition of Logic and *Philosophia,* winding back over the centuries to ancient Greece and beyond, finally achieves semiotic *in actu exercito,* while with Locke it is achieved *in actu signato,* that is, the *doctrina signorum* first systematized by Poinsot receives from Locke what was destined to become its proper name. From the seventeenth century onwards, the relation of logic to semiotics is something achieved both in fact and in name, though the achievement will not be recognized for another 300 years.

SEMIOSIS — the building up of a structure of experience through sign-relations *(signa in actu exercito)* founded in:

ENS REALE — the things of nature which give rise to speculative understanding

and/or *ENS RATIONIS* — things of experience which have no proper being apart from our activities and which we endeavor to control through art and ethics, i.e., practical understanding

SEMIOTICS — reflections upon the role of signs in structuring experience and revealing nature and culture to our understanding *(signa in actu signato)*

Figure 11.

Keeping within our chosen perspective of logical development, then, what happens between Locke and our own day?

From the point of view of semiotic, just as Poinsot's *Tractatus de signis,* so also Locke's proposal for a new approach to the sciences, falls still-born from the press. If one looks at the posthumous editions of Poinsot's *Ars Logica,* one finds that the editors unmistakably and systematically misunderstand entirely the standpoint of his semiotic, concerning themselves only with reducing it so far as possible to the prejacent perspectives of logical and ontological philosophical analyses, as witnessed in Gredt in our own time (discussion in Deely 1972; EA note 94). If one looks in the national language traditions for traces of Locke's influence, indeed one finds it everywhere, but nowhere on the point of semiotic as 'another sort of logic and critic than we have been hitherto acquainted with'. Indeed, the chapter proposing semiotic is commonly omitted from the many abridged editions of Locke's celebrated work that appear in succeeding centuries. The silence is broken, it would seem, only by Leibniz's superficial criticisms in his *Nouveaux Essais sur I'entendement humain* ([composed 1704; published 1765], which Fräser appends in the notes to his classical 1894 edition of Locke's text [p. 463], and for the evaluation of which the

best preparation might well be a careful reading of the Aristotelian tract on the unmasking of spurious arguments so influential in the thirteenth and fourteenth centuries, *De Sophisticis Elenchis)* — until, of course, Peirce's reading of Locke's proposal (cf. Sebeok 1974: 5-10), soon after which the silence is thoroughly shattered!

From the point of view of Logic too, whether 'formal' or 'material', as from the point of view of semiotic itself, we encounter from the seventeenth century an extended period of barrenness, curiously styled 'classical' logic, which is characterized by a diffuse interest centered 'much more on rhetorical, psychological, and epistemological problems than on logical ones' (Bochenski 1961: 254). As a consequence, if we omit, as (we have seen) has long been the custom of researches in these areas, consideration of the contributions of the Latin Iberian mainstream, it can be said that 'from the 400 years between the middle of the fifteenth and the middle of the nineteenth century we have', as the Kneales (1962: 298) put it, 'scores of textbooks but very few works that contain anything at once new and good'. Bochenski (1961: 9) speaks just as harshly of 'the utterly barren period' stretching from Descartes to the mid-nineteenth century, when the new development of formal logic begins. Typical of and early in this decadent phase was the famous *La Logique ou l'Art de Penser,* the so-called *Port Royal Logic,* of Arnauld and Nicole (1662).

Barren as this period seems to have been with respect to the problematic of formal logic, if we recall the more integral problematic adumbrated by the entire organon, it should be noted that the work of two men stands out in this period by reason of their efforts to flesh out the problem of *induction,* efforts which go far beyond anything to be found in the earlier periods. William Whewell (1794-1866) published in 1837 his three-volume *History of the Inductive Sciences, From the Earliest to the Present Time,* followed by his *Philosophy of the Inductive Sciences, Founded Upon their History,* in 1840. John Stuart Mill (1806-1873) published his *System of Logic* in 1843, large portions of which are devoted to the problems of induction.

But the most fertile development in this area for semiotics comes much later, with the re-discovery by C. S. Peirce around 1866 that the notion of induction is heterogeneous, comprising not one but two distinct fundamental kinds of arguments, the movement of the mind whereby we form a hypothesis on the basis of sensory experience, which Peirce called *abduction* (sometimes 'hypothesis', also 'retroduction'), and the movement back whereby we confirm or infirm our hypothesis with reference to the sensory, for which movement Peirce retained the name *induction.* Fisch (1980: 11) writes as follows:

The extreme diversification of Peirce's work had a focus and a purpose. The focus was in logic, conceived at first as a branch of a branch of semiotics, but eventually as nearly coextensive with it, though with a distribution of emphasis different from those of semioticians who are not logicians. The purpose was to distinguish the possible kinds of semioses or sign-functions, and, among them, to make the most thorough study he could of arguments in particular, and above all of their functions in mathematics and in the sciences. His major single discovery was that what he at first called *hypothesis* and later *abduction* or *retroduction* is a distinct kind of argument, different both from deduction and from induction, and indispensable both in mathematics and in the sciences. This discovery came at least as early as 1866 ....

I call this a rediscovery, because it seems to be a very fruitful elaboration of the distinction commonly taught in the summulist tradition under the heading of induction, between *ascensus* ('abduction') and *descensus* ('induction'). For example, Poinsot, 1631:

Liber Secundus Summularum, cap. 5:… the kinds of arguments … can be reduced to two, namely, syllogism [deduction] and induction. … For there are but two ways of showing that something is so, to wit, either by reasoning from principles grasped intellectually, or by referring to sensible particulars whence all our knowledge takes rise.

Liber Tertius Summularum, cap. 2: … St. Thomas [c. 1269-1272] posits but two ways of acquiring scientific knowledge, to wit, demonstration and induction. Demonstration indeed is a syllogism, which proceeds through universals; whereas induction proceeds in terms of singulars, by the fact that all of our knowledge originates from the particulars perceived by sense.

Induction accordingly is defined as [4]a movement from sufficiently enumerated particulars to a universal'; as if you were to say: This fire heats, and that one, and that one, etc. Therefore all fire heats.' And since opposites have a common rationale, under this definition of induction, which is in terms of ascent, its opposite is understood, namely, descent, that is to say, the movement from universals to singulars. And induction, as regards *ascent,* is ordered to the discovery and proof of universal truths as they are universals, that is, insofar as they correspond with the particulars contained under them. For it cannot be shown that anything is the case universally except from the fact that its particular instances are such. *Descent* from a universal to particulars, on the other hand, is principally ordered to showing the falsity of a universal as such. For the falsity of a universal is best established by showing that something that falls under it is not the case. At the same time, supposing the truth of a universal established and discovered through abduction [per ascensum], induction [descensus] also serves to show the correspondence of the universal to those singulars contained under it.

Liber Tertius Summularum, cap. 3: On the Manner and Means of Resolving Terms by Ascent and Descent'.

In the line of formal logic itself, the middle of the nineteenth century saw a more or less sudden awakening with the pioneer work of George Boole, *The Mathematical Analysis of Logic,* published in 1847, the same year as de Morgan's *Formal Logic.* From that time to the present, in several different directions (Jevons 1864; Schröder 1877,1891-1895; Frege 1879; Peano 1889; Hubert 1905; Whitehead and Russell 1910-1913; Carnap 1937; and many others) of'formal logic', we might say that if the Aristotelians of the Latin period developed a formal logic, then the development after Boole must be called formal with a vengeance!

Leibniz (1646-1716) envisioned the possibility of a logical language so perfect that merely by mechanical manipulation it would be possible to traverse all the possibilities of human knowledge (see entry in References). He dreamed indeed of a kind of religious order which, by this logistic method, would resolve the theological disputes which had plunged Europe of his day into unending sectarian warfare![20]

Russell's theory of descriptions in our own day, or Carnap's work on a logical language, is not so different. What happens in logic to inspire such dreams in periods otherwise so diverse?

I think basically two ideas are at work, one fundamentally erroneous, the other ingenious and of considerable technical merit, but both of which have the effect of divorcing logic from concerns of common life or substantive use in philosophy, and reducing it to a subspecies of semiotics far removed from the foundations of a doctrine of signs.

The first and chimerical notion is that logic is properly a branch of mathematics, or in the more extreme form owing especially to Frege, that logic and mathematics are essentially one — all mathematical terms can be defined by logical terms, and all mathematical theorems can be deduced from logical axioms. Russell and Whitehead set themselves to demonstrate this thesis in their *Principia Mathematica* and failed.

The other notion, which has merit on its own terms if pursued for what it is, is that the understanding of purely logical relations might in some respects be advanced if the semiotic web of natural language were abandoned, and in its place were substituted a totally controlled, stipu-lated artificial symbolic system. The pure forms of inner consistency within such a system of axioms and stipulated markers can then be explored with a thoroughness and rigor that proves impossible in the complex historical system of actual language. Moreover, within such a construct, the use of methods of calculation becomes possible to such a degree that this latest phase of formal logic is commonly called 'math-

ematicaP, a designation which has not advanced clarity in the under-
standing of what is fundamentally involved in the study of inner
consistency when an artificial symbolic system is substituted for one that is
capable of performing the actual task of sustaining a sociocultural system
in its manifold relations to the extralinguistic realities which surround and
penetrate human life. Nonetheless, what is revolutionary about con-
temporary logic is not the aspect of calculus; on the contrary, the aspect of
calculus is itself entirely dependent upon, becomes possible only in
function of, the fundamental innovation that, in contrast to all the
previous forms of logical development, the so-called 'symbolic' or
'mathematical' logic, as Bochenski puts it (1961: 412):

> proceeds *constructively,* i.e., by investigating logical laws in an artificial language
> that it has devised. Such artificial languages exhibit very simple syntactical and
> semantic relations, as compared with natural languages, with the result that
> formal logic has undergone a change very like that effected by Galileo in the
> domain of physics. Instead of the immediate, but complex facts, the simpler
> underlying connections can now be investigated.

All the earlier varieties of logic, notably the Latin summulisttraditions
in Iberia and elsewhere between 1350 and 1650, this same author notes
(1961: 266):

> make use of an *abstractive* method; the logical theorems are gained by abstraction
> from ordinary language. Mathematical logicians proceed in just the opposite way,
> *first constructing* purely formal systems, and later looking for an interpretation in
> every-day speech.

The constant and deliberate increase in formalism, i.e., use of a calculus
as the general principle of logical method after Boole, becomes possible
precisely and only because, as in mathematics, 'the *shape* and not the *sense*
of the symbols' (Bochenski 1961: 266) is the matter of the rules of
operation. Where a natural language is concerned, resort to formalism is
possible only within the limits imposed by the *sense* of what is being
formalized: hence the importance of the discussion of *suppositio* among
the scholastic logicians, comparable to the importance of quantifiers in
symbolic logic (cf. Kneale and Kneale 1962: 511); hence also the fact that
formalism had already been employed and highly developed 'in scholas-
ticism especially', but could never before receive 'such thorough-going
application' as to become the general principle of method it becomes in
'mathematical' logic (cf. Bochenski 1961: 266, 412).

In the early stages of this development, it was commonly held that there
was an opposition and competition between the Old' 'Aristotelian' logic

and the 'new', 'true' logic. Of course, the mere fact that no scientific history of formal logic existed at the time, and a few centuries had intervened between the 'new' logic and any tradition that could seriously and substantively be called Aristotelian, did not at first interfere with anyone's enthusiasm, least of all Bertrand Russell's 'No wonder then', comments Bochenski (1961: 9), 'that with the rise of mathematical logic theorems belonging to the elementary wealth of past epochs were saddled with the names of De Morgan, Peirce, and others.'[21]

As sanity and sobriety began to prevail, thanks to the more profound inquirers in the new area such as Peirce, Lukasiewicz, and most recently Bochenski, it became possible to see that even the logic of the *Principia* can more profitably be viewed as an outgrowth and a development and in one very precise sense the perfection of the formal problematic of the *Analytica Priora*[22] because now the entire philosophical-epistemological baggage of 'material logic' has been, through the simple expedient of purely artificial language, effectively jettisoned in favor of a study of the inner consistency of symbolic forms purely and entirely for its own sake, divorced from any check of further concerns. In this sense there is a continuity, it is possible to argue, between mathematical logic and the problematic of the prior analytics, if that problematic is first isolated within the *Organon* and then pursued entirely for its own sake — no longer for the purpose of an *ars seu logica utens,* but solely for the purpose of developing a 'science' in its own right, the science of necessary relations so far as they can be traced to the control and stipulations of men. Viewed in this light, 'mathematical' logic does indeed appear as an outgrowth, development, and perfection of the constant tradition of formal logic, so that, as Bochenski says (1961: 413), 'there can be no doubt that in this period formal logic once more attained one of its peaks of development'.

From the point of view of semiotic, however, 'perihermenias' in that full sense of the interpretive activity coextensive with cognitive life,[23] mathematical logic appears only as a most restricted form of interpretation, far more restricted even than the too narrow tradition of Aristotelian commentary on the *De Interpretation* criticized so effectively by Poinsot for leaving the *foundations* of logical form unexamined.

To appreciate this, recall the division of instrumental signs into 'ex instituto' (stipulated) and 'ex consuetudine' (customary). Applied specifically to the signs of language, linguistic forms, it is possible to show that both these aspects are constantly at play in ordinary language and in fact that it is precisely this interplay that defines the term 'natural' as it functions in the expression 'natural language' (cf. Deely 1978a, 1980.) The habit structures of a population, the experiences of a people; the fact that when I communicate with you using words of a common language, those

words yet have resonances in your mind that they do not have in mine; and conversely, the fact that there are riches of connections in the linguistic traditions of the English language or of the German tongue or of the Latin tongue, sign relationships that are carried there embodying a collective history of the peoples and specific populations — when you substitute the element of *ex institute* so far as possible for all elements of custom, when you cut off what is arbitrary from all that has become naturalized in a language, all that is exactly what drops out: history, and experience, the very elements that, by their presence and incremental growth, gradually pressured thinkers of the renaissance in the summulist tradition who strove constantly to take account of them in the direction of an ever richer understanding of signification culminating eventually, in a privileged instance, with a grasp of the foundations of logical in-terpretation in semiosis, with all that implies for the theories of knowledge and truth (Deely 1974: 856-857).

With the dominant contemporary logic, the pressures on the movement of thought tend in precisely the opposite direction. In the context of natural language, the understanding of logical interpretation tends to broaden beyond the confines of what can be stipulatively controlled. Ultimately, following out this tendency leads from within logic itself to a foundational doctrine of signs, both philosophically and historically. In the context of an artificially stipulated symbolic system, the understanding of logical interpretation tends rather to narrow itself precisely to the elements of control, and become a pure technique, a calculus of con-sequences more and more empty of natural substance. In the extreme, this tendency leads logic itself into a hollow or empty formalism, more and more technically perfect, as relations of reason build upon one another constructs ever more intricate and subtle, but by the same token further and further removed from foundations in reality — what the older logicians used to call 'distinctions of reason reasoning' (cf. Poinsot 1632: 294al-300b48).

The philosophers of our universities today who have attached them-selves to such a method, therefore, not surprisingly find themselves without a great deal to say of general interest for semioticians. Theirs is a technique which belongs to the field of semiotics, not to the area of semiotic foundations (Deely 1976: 171-173: 1977; 1978a; and esp. 1982: I.C.); a technique which is not even by itself properly logic (Bochenski 1961: 17), and which has strictly an *ad hoc,* never a properly systematic value for the exposition of any given problem or set of problems, be it in logic or philosophy or anywhere else (Deely 1975a, 1975b: 254-271; cf. Bochenski 1961: 22-23).

You can see, then, that the maturation of semiotic imposes the

conditions of a revolution on contemporary philosophers. It will, for the first time, exhibit unmistakably the proper and central place of historical experience in philosophical reflection; secondarily, as a consequence of this if nothing else, it will force an entire reevaluation and redistribution of the materials of intellectual history; and it will end the diverting of students away from the substance of philosophical education.

Of course it may be, as Heidegger believed, that the logistic and 'scientific' philosophers are so far gone down their byway that future thought in these areas will no longer be called philosophy.

Be that as it may, semiotic and semiotics are here to stay.

Summative

The relation of logic to semiotics, therefore, is complex, both in itself and historically, depending upon how logic is conceived. In its most proper conception as formal logic, it falls under anthroposemiotics at the linguistic level of exchange. So viewed, it can be further specified according as it is regarded as an interpretive activity, such as it was for the Greeks and Latins, or as a constructive activity first of all, such as it has largely become in contemporary academe. As an interpretive activity, however, it can also be expanded as the self-reflective use of signs in the way suggested by Peirce, Locke, and Poinsot. Pursued in this way, logic becomes the doctrine of signs, coextensive with semiotic itself and synonymous with it. But in this sense it also absorbs the whole of epistemology and traditional philosophy of nature, at least in foundational respects. It is in this sense that the history of logic provides a privileged access to the understanding of semiotic, and a striking proof of Gilson's thesis (1937) that knowledge of history is for the philosopher what laboratory experiment is for the scientist, namely, essential for reliable progress in his or her speculations. The same of course holds for the semiotician, who is after all tomorrow's philosopher.

Notes

* This essay is dedicated in gratitude to Paul Bouissac, who did more than any other single individual to create the rich environment of ISISSS '80; and, in a personal way, to William Passarella, who listened and commented in patience.

1. 'What most men in later centuries have called logic is the study of questions such as Aristotle discussed in the works of his *Organon:* and the novelty of the Stoic contribution, as we see it in retrospect, is not any new demarcation of subject-matter, but an emphasis on relations of propositions as distinct from relations of universals or concepts.' Kneale and Kneale 1962: 737

2. I cite Weisheipl 1965:62-66: The *Institutiones* of M. Aurelius Cassiodorus, a junior contemporary of Boethius, was written as a manual of divine and secular literature for the monks of Vivarium about the year 544-5. The first book is a compendium of Sacred Scripture, exegesis, hagiography and religious discipline; the second book is a summary of the seven liberal arts; grammar, rhetoric, dialectic, arithmetic, music, geometry and astronomy. This second book, which became exceedingly popular in later centuries, is drawn largely from Boethius, Cicero, Donatus, Quintillian, Varro and St. Augustine. At the beginning of his summary of dialectics (lib. II, c. 3) Cassiodorus discussed the definition and division of philosophy, a procedure which was frequently followed throughout the Middle Ages. The schematic classification of philosophy given by Cassiodorus is simply that of Boethius, but in one popular recension, probably of the eighth century, this classification is attributed to Aristotle (see Figure 12). Natural philosophy discusses the nature of each thing which is produced naturally; doctrinal philosophy is the science which considers abstract quantity, i.e., quantity which has been mentally separated from matter or from the other accidents; philosophy is called 'divine[1] when it considers the ineffable nature of God or when it discusses spiritual creatures. Cassiodorus briefly defined each of the doctrinal, or mathematical sciences as well as the practical. The rest of the second book is devoted to the seven liberal arts. In the early Middle Ages the second book of Cassiodorus' work seems to have been copied separately and expanded by scholars desiring a fuller compendium of the arts.

    The encyclopedic *Etymologiae,* libri **XX** of St. Isidore of Seville was composed early in the seventh century and enjoyed great popularity as a reference work throughout the Middle Ages. A summary of the seven liberal arts was given in the first three books: I, grammar; II, rhetoric and dialectics; HI, arithmetic, geometry, music and astronomy. Following Cassiodorus and Boethius, Isidore discusses the definition and division of
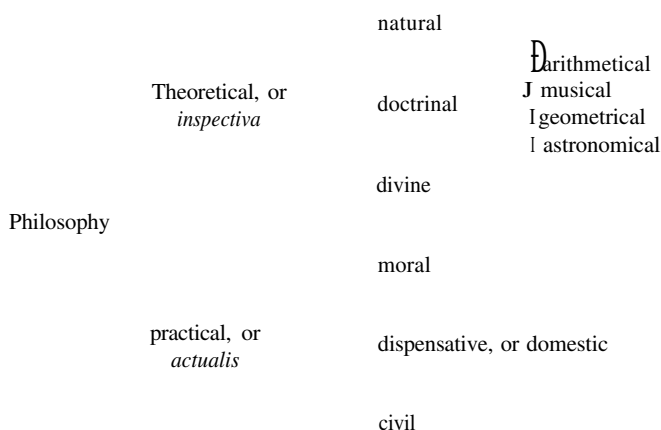

Figure 12.

philosophy at the beginning of his compendium of dialectics (lib. II, c. 3), but he gives two divisions of philosophy. The first is the familiar Stoic classification, which St. Augustine attributed to Plato, namely the division of philosophy into physics, ethics and logic. According to Isidore, Plato divided physics, or natural philosophy into arithmetic, geometry, music and astronomy. The division of logic into dialectics and rhetoric is also attributed to Plato, while the division of ethics according to the four cardinal virtues is said to have originated with Socrates, who first established moral science. St. Isidore's version of this classification can be represented briefly as follows (Figure 13). For Isidore the whole of theological teaching can also be adapted to this classification, for it discusses nature (Genesis and Ecclesiastes), ethics (Proverbs and other books) as well as logic (Canticle of Canticles and the Gospels). The second division of philosophy given by Isidore is taken directly from Cassiodorus without alteration.

'St. Augustine, Boethius, Cassiodorus and St. Isidore served as the principal sources for all later discussion of the seven liberal arts and the tripartite division of philosophy. As the early Middle Ages were unaware of the numerous Greek works on natural science, metaphysics and ethics, repetition of the Boethian and Stoic classification of the sciences had little significance and no practical value for teachers of the arts. Misunderstanding of the original divisions and confusions of the issues involved were the inevitable result of not having the Aristotelian Corpus. This confusion can be seen in writers from the ninth through the twelfth century. Alcuin of York selected the Stoic division from Isidore as the point of departure for his *De dialectica,* presumably because it included the mention of dialectics, while the Boethian division did not. Rabanus Maurus likewise took the Stoic division, but he included under physics seven arts: arithmetic, astronomy, astrology, mechanics, medicine, geometry and music. Scotus Erigena combined the Boethian and Stoic classification when he divided philosophy into (i) *activa* or ethics; (ii) physics, or natural science, subdivided into the quadrivial arts; (iii) theology, which discusses God; (iv) logic, or rational philosophy, which shows the rules by which the other "parts of wisdom" are to proceed.

'In the twelfth century a more thorough synthesis of the two ancient classifications was presented in the various *Didascalia,* or general introductions to the *artes.* These summary treatises follow the general pattern of the traditional *Disciplinarum libri,*

	physics	I arithmetic I geometry I music astronomy
Philosophy	ethics	prudence justice fortitude temperance
	logic	J rhetoric ^dialectics

Figure 13.

discussing the nature and classification of learning, and briefly explaining the nature of each art. The best known of these is the *Didascalion* of Hugh of St. Victor (1096-1141). In this remarkable treatise seven mechanical arts are introduced as parts of philosophy in order to balance the seven liberal arts; all seven liberal arts, including grammar, find a place in this classification; and it is a successful combination of the Boethian and Stoic divisions of science. "Philosophy is divided into theoretical, practical, mechanical and logical; these four branches embrace all scientific knowledge/' Except for the mechanical arts, the basic division of scientific knowledge is that of the Stoics. In this case "physics" is taken to be equivalent to "theoretical" and coextensive with Boethius' tripartite classification of speculative philosophy' (see Figure 14).

3. Notice that in this scheme Natural Philosophy is conceived in such a way as to subsume the subject matter of 'metaphysics — as St. Thomas put it, 'ita quod sub naturali philosophia comprehendamus et metaphysicam', a point that is of some importance for understanding the development of university curricula in the Renaissance, particularly in the Iberian schools. See our chart of the Curriculum of Arts in the seventeenth century at the University of Alcala in this article (Figures 8-8d).

4. 'It was a question much debated in antiquity', the Kneales note (1962: 737), 'whether logic should be accounted a branch of philosophy, as the Stoics said, or merely a preliminary to philosophical studies as the peripatetics maintained.' With the glib superficiality that has become the hallmark of academic philosophy in Britain in this century where basic issues are concerned, the Kneales see in this debate 'little more than

theology, deals with forms separated from matter

theoretical, or   * mathematics $<$ music $\geq$ bodies considered
speculative $\wedge$geometry A apart from matter
(= *naturalis)*   astronomy l

physics, deals with forms in matter

ethics

practical, or $<$ economics
active
(=*moralis)*   politics

mechanical, or
adulterine   ƒ

grammar

logic, or   ' dialectics
$\wedge$*sermocinales*

rhetoric

Figure 14.

a quarrel about words'. In fact, the very definition of philosophy and its relation to the order of mind-independent being was at stake in this quarrel.

5. The list of predicables includes only four terms in Aristotle himself *(Topics)*, namely, definition *(ïñüò, ïñéôìüò)*, genus *(āÝîò)*, property *(ßäêíi)*, and accident *(óîâââçêüò)*. But a definition for Aristotle is attained by a difference *(äéáöïñÜ)* added to a genus, which gives a species *(åßäïò)*. Whether therefore Porphyry's substitution of the two terms (difference and species) in the list for Aristotle's one term (definition) is a clarification or rather somehow a doctrinal perversion 'mixing and confusing logic with metaphysics' is a question we can only mention here: see Warren 1975: 11, note 3, for a preliminary discussion with references.

6. 'L'influence de Boece... au Moyen Age... a ete par ses traductions, ses commentaires et ses traites de logique (qui remplaceront, pour une part, ses traductions et commentaires non transmis), 1'introducteur d'Aristote en Occident. Certes, il n'a introduit, et encore partiellement, que la seule logique; mais celles-ci, et davantage encore les ecrits personnels de Boece, contenaient bon nombre de notions physiques et metaphysiques, que les lecteurs medievaux s'empresserent de saisir au passage' (Cappuyns 1937: col. 376).

7. This must be said, for of course, to say nothing of the influence of Megarian-Stoic logic (as Bochenski 1961: 106 terms it), 'in addition to literal commentaries … Boethius had written treatises of his own on categorical and hypothetical syllogisms and on dialectical and rhetorical arguments (or "topics"), adding to these a commentary on Cicero's *Topics'* (Moody 1967: 528). See entry for Boethius in the References, below.

8. As points of interpretation go, consensus on this one is exceptionally broad. E.g., cf. Ackrill 1963: 71, note:'… it is important to recognize from the start that the *Categories* is not primarily or explicitly about names, but about the things that names signify. … Aristotle relies greatly on linguistic facts and tests, but his aim is to discover truths about non-linguistic items.' Compare this with the assessment of Poinsot (1632: 500b36-501a2): 'The distinction of the categories was introduced for this, that the orders and classes of diverse natures might be set forth, to which all the things which participate some nature might be reduced, and on this basis the first thing that must be excluded from *every* category is mind-dependent being, because being which depends for its being on being cognized (so-called mind-dependent being) has not a nature nor a true entity, but a constructed one, and "therefore must be relegated not to a true category, but to a constructed one. Whence St. Thomas says (in q. 7, art. 9 of his *Disputed Questions on Power)* that only a thing independent of the soul pertains to the categories.'

9. Aquinas, c. 1269-1272a: 'Proemium', opening paragraph: '… hominum genus arte et rationibus vivit: in quo videtur Philosophus tangere quoddam hominis proprium quo a caeteris animalibus differt. Alia enim animalia quodam naturali instinctu ad suos actus aguntur; homo autem rationis judicio in suis actionibus dirigitur. Et inde est quod ad actus humanos faciliter et ordinate perficiendos diversae artes deserviunt. Nihil enim aluid ars esse videtur, quam certa ordinatio rationis quomodo per determinata media ad debitum finem actus humani perveniant.

    'Ratio autem non solum dirigere potest inferiorum partium actus, sed etiam actus sui directiva est. Hoc enim est proprium intellectivae partis, ut in seipsam reflectatur: nam intellectus intelligit seipsum et similiter ratio de suo actu ratiocinari potest. Si igitur ex hoc, quod ratio de actu manus ratiocinatur, adinventa est ars aedificatoria vel fabrilis, per quas homo faciliter et ordinate huiusmodi actus exercere potest; eadem ratione ars quaedam necessaria est, quae sit directiva ipsius actus rationis, per quam scilicet homo in ipso actu rationis ordinate, faciliter et sine errore procedat.

'Et haec ars est *Logica,* idest rationalis scientia, Quae non solum rationalis est ex hoc, quod est secundtun rationem (quod est omnibus artibus commune); sed etiam ex hoc, quod est circa ipsum actum rationis sicut circa propriam materiam.

'Et ideo videtur esse ars artium, quia in actu rationis nos dirigit, a quo omnes artes procedunt. Oportet igitur Logicae partes accipere secundum diversitatem actuum rationis.'

10. The notion of 'natural language', which has not to my knowledge been adequately explored yet as such (cf. Deely 1980), must not be confused with the notion of Ordinary language' which has been so abused in contemporary philosophy after Wittgenstein. Ordinary' language is a chimera opposed to the language of technical and specialized pursuits, and used by certain 'linguistic' philosophers after the manner of a talisman to make philosophical problems 'disappear'. I call it a chimera, because in truth it has no proper existence as such, being in truth only inadequately distinct from the technical vocabularies and constantly modified by them. Ordinary language', in short, is a sociological phenomenon, not primarily a philosophical one, and decidedly relative to the culture and consciousness of specific ages. Natural language, by contrast, is the semiotic web constituting a linguistic community at any given time in its totality and diachronically as well as synchronically. Ivo Thomas (1967: 960), speaking of what might be called early anticipations of so-called 'classical logic' (which will be discussed further on in this essay) as it appeared more or less full blown in the Port-Royal Logic, writes as follows: 'It was about 1440 that the first recorded voice of the new age, or non-age, in logic made itself heard. L. Valla, a renowned humanist scholar, then rejected the third figure of the syllogism on the grounds that women, children, and nonlogicians generally, do not argue that way. Perhaps this is the first time that ordinary language was claimed as the standard of logical doctrine. Evidently all sense of syllogistic as a deductive system had been lost; indeed Valla said that conversion, Aristotle's chief means of deduction, is only a "remedy for sick syllogisms." R. Agricola's *De dialectica inventione* swung the ambivalent "topical" tradition firmly into the path of rhetoric, in contrast with Abelard. P. Melanchthon, writing in 1521, expounded Cicero's syllogism before Aristotle's. Older doctrines were quickly dropped or ridiculed. G. Savonarola kept telling the 16th century in numerous reeditions that anyone arguing from a conjunction to one of its parts was *dignus explosione.*

'In mid-16th century, vernacular logics began to appear, e.g., T. Wilson's *The Rule of Reason* (1551) and the *Dialectique* (1555) of Peter Ramus. This last writer's views on logical reform provoked widespread and long-lasting controversy. His simplified syllogistic and novel terminology occasioned long commentaries on very little and a new technical scholasticism. Aristotelians found little to discuss besides the iniquities of Ramism and the fourth figure of the syllogism, few recognizing that this was a matter to be settled by definition. Sextus Empiricus appeared in Latin in 1569, but led to no rediscovery of Stoic logic.

'There was an occasional break in the clouds. J. Hospinianus (1515-75) thoroughly investigated syllogistic on a combinatory basis, and G. Cardano illustrated his *Dialectica* with geometrical arguments. J. Junge *(Logica Hamburgensis,* 1638) showed a deductive interest in the syllogism and some appreciation of Aristotle's logic of relations. In 1662 A. Geulinex pleaded for the restoration of medieval doctrines. In that year the "Port Royal Logic" of A. Arnauld and P. Nicole was published. Antirhetorical and anti-Ramist, the authors idolized geometry and did much to tighten up syllogistic theory. At the same time they opened the way to introducing epistemological and psychological discussions into books of logic.'

11. Ashworth (1974: 2), after deftly summarizing the accepted conventions established

regarding the role and place of Petrus Hispanus in the development or history of Logic, continues: 'If one looks up "Petrus Hispanus" in Risse's invaluable *Bibliographia Logica,* one finds that no editions appeared in Spain or England, a few in Paris, some in Germany, Poland, the Netherlands and Belgium. Deventer leads with sixteen editions between 1485 and 1528. After 1528 there are only seven editions, the last in 1639, and *all* were printed in Venice.'

12. Thus Fonseca 1564: 'Praefatio': 'Adeo inops fuit politioris Literature superior aetas, ut cum omnes, qui Philosophiae studia consectabantur, Aristotelici haberi vellent, paucissimi essent, qui Aristotelem evolverent. Arbitrantur enim Aristotelicam doc-trinam planius, et expeditius in summulis quibusdam, ac quaestionibus, quas diligen-tiorum industria pepererat, quam in suo auctore contineri.'

13. E.g., Thomas 1967: 960: '⅃. Aldrich, in his *Anis logicae compendium* (1691), correctly tabled 24 moods of the syllogism in 4 figures and methodically proved all others invalid.'

14. Eco (ISISSS lecture of 6/6/80) has pointed out that this famous text, everywhere cited and made much of, as a matter of fact does not fit in very well with the main thrust of the context in which it appears, as though it were an *obiter dictum,* hardly a proof text of something well thought through or established.

15. 1957, ix-xi: 'Scholastic philosophy found its mature expression during the thirteenth and fourteenth centuries. The scholasticism of the thirteenth century was pre-dominantly receptive and constructive in its tendencies. Its chief exponents were mainly interested in absorbing the wealth of philosophical learning that came to them from Greek and Arabic sources, and in constructing articulate systems comprising the thought of their time. Their work can perhaps best be called 'synthetic'. By contrast, fourteenth-century scholasticism was occupied in sifting, revising and adapting its rich legacy of ideas. Its chief exponents focused their attention on the structure of the traditional philosophy itself; they tested its basis and examined the solidity of its parts. Their philosophy may therefore be characterized by the term "critical". These labels must not, however, be taken as mutually exclusive. Neither the thirteenth nor the fourteenth century was without originality; and while in the thirteenth century a sound sense of criticism was visibly active and alive, the fourteenth proved itself by no means incapable of building systems.

    'In one aspect the two centuries are two parts of a single whole — the period of classical scholasticism. There is a tendency on the part of historians who have mainly studied the thirteenth century to look upon them as two distinct or even opposing periods. In their view the thirteenth century is unmistakably the golden age, the fourteenth a period of decline and decadence. Yet it remains an historical fact that there was a unity of civilization and religion ensured by an agreement in holding the dogmas of the Catholic faith, dogmas which it was their main endeavour to elucidate. There was the unity of an unbroken academic tradition guaranteed by the use of common textbooks, viz. the writings of Aristotle, the *Sentences* of Peter Lombard and others, which had to be read and publicly interpreted by anyone aspiring to academic degrees. Within this unity there was a lively discussion of the various conflicting solutions of the common problems, but, in contrast to the terminological confusion of modern philosophy, this discussion was grounded on the use of a generally accepted common technical language'. What Boehner observes here is true as far as it goes, but it does not go far enough. The 'period of classical scholasticism', as Boehner describes it, extends in fact all the way to the middle of the seventeenth century. Boehner's preference for the fourteenth century is at least as arbitrary as the preference of those historians he criticizes for the thirteenth century. The epoch of natural philosophy is as cultural life

goes a 'natural' unity in the Latin West, and -needs to be studied as such. When sufficient work has been done, the 'standard historiographies' will be revised accordingly.

16. 'Signa formalia sunt similitudines, seu species quaedam rerum significatorum in potentiis cognoscentibus consignatae, quibus res significate percipiuntur. Huius generis est similitudo, quam mons obiectus imprimit in oculis: item ea, quam amicus absens in memoria amici reliquit; item ea, quam quis de re, quam nunquam vidit, effingit. Dicuntur autem formalia signa, quia formant, et quasi figurant potentiam cognoscentem. Signa instrumentalia sunt ea, quae potentiis cognoscentibus objecta, in alterius rei cognitione ducunt. Huius generis est vestigium animalis in pulvere impressum, fumus, statua, et alia huiusmodi. Nam vestigium est signum animalis, a quo impressum est: fumus vero, ignis latentis: statua denique Caesaris, aut alicuius alterius. Haec dicuntur signa instrumentalia, vel quia his quasi instrumentis, conceptus nostros alijs significamus: vel quia quemadmodum artifex, ut instrumento moveat materiam; necesse est, ut moveat instrumentum, sic potentiae ad cognoscendum aptae, ut hoc signorum genere rem aliquam cognoscant, necesse est, ut haec signa percipiant. Hinc colliges apertissimum discrimen inter haec signa, et superiora: illa siquidema non sunt a nobis necessario percipienda, ut ipsorum perceptione in rei significatae cognitionem veniamus: haec autem nisi percipiantur, nemini alicuius rei cognitionem adducent.' A comparative translation is found in Romeo (1979: 194-195), based on other editions than my Venice, 1611.

17. Translation basically by Romeo (1979: 201 note 1). Bosserel's lectures, MS 133 of the University of Graz, are published as an Appendix to Ferreira Gomes 1964: 779-861, neither of which sources had I access to at the time of the June 24 lecture. For information and text on this point, I was at the time entirely dependent on Romeo (1979: esp. 190, 198-200, and 201 note 2). The text itself as published in Ferreira Gomes, vol. II, p. 800, reads: 'significare autem est aliquid potentiae cognoscenti representare, ut sensui, phantasiae, intellectui.

'Dividuntur signa duplici divisione. Prima in formalia et instrumentalia. Formalia sunt similitudines, seu species quaedam rerum significatarum in potentiis cognoscentibus quibus res significatae percipiuntur, ut similitudo amici, et haec signa non habent opus cognosci sicut ut videam oculo non necesse habeo ipsum oculum videre quo video.

'Instrumentalia sunt quae potentiis cognoscentibus obiecta non solum ipsa cognoscuntur, sed etiam in alterius rei cognitionem ducunt, ut vestigium animalis, fumus, rugae in fronte.

'Secunda naturalia et ex instituto. Naturalia sunt quae apud omnes idem significant, ut gemitus et risus. Ex instituto, quae ex hominum voluntate, et quadam quasi conventione significant, ut voces et characteres, et quae apud omnes populos usurpata sunt, ut hedera, cupressus.

'Nota quod etiam naturalia possint esse formalia, haec non omnia. Conceptus enim et gemitus sunt naturalia, gemitus tarnen non formale, sed instrumentale.'

18. 'Atque ut alte, et a capite significandi modos, repetam, Significare nihil aliud est, quam potentiae cognoscenti, aliquid repraesentare. Cum autem omne, quod aliquid repraesentat, sit signum rei, quae repraesentatur, efficitur, ut quicquid rem aliquam significat, sit signum eius.' The text does not seem right here. Cf. translation in Romeo (1979: 194).

19. 'Signa vero ex instituto sunt, quae ex hominum voluntate, et quadam quasi composition! significant. Quorum rursus duo sunt genera. Nam quaedam significant ex impositione, utpote voces quibus homines colloquuntur, et scripta, quibus absentes inter se communicant: alia ex consuetudine, et communi usurpatione: quo pacto ea,

quae pro foribus appenduntur, significant res venales. Eorum porro, quae ex impo-
sitione significant, duplex est signification propria, et impropria— Fere autem verba ad
aliquem modum *(ôñüðíí* Graeci vocant) traducta, et immutata, impropriam habent
significationem: ut quae per Metaphoram, Catachresim, Metalepsim, et Metonymiam
immutantur.'

20. A similar vision had inspired Ramon Llull, or Lull (c. 1232-1316), who like Leibniz
dreamed of a logic in which calculation would hold the central place. 'Lull even
designed machines, formed of superimposed rotating discs, by which his calculus could
be worked out mechanically', Moody notes (1967: 530), 'an enterprise which perhaps
earns him the right to be called the father of computer programming.'

The desire to bring about the conversion of Muslims and Jews, as well as pagan
Tartars, which inspired Lull's ceaseless activity, also inspired his writings', Hillgarth
writes (1967: 107-108). 'Despite the clear analogies between the two systems, Leibniz
took over only part of Lull's ideas, omitting Lull's original purpose of the Art as a
means of converting infidels.' Apparently, Hillgarth does not know the story of
Guilemus Pacidius, whom Leibniz created for the express purpose of 'the complete
reunification of mankind, through Christianity'.

It should also be noted that Lull was the first Christian philosopher of the Middle
Ages to use a language other than Latin, namely, Catalan, and sometimes Arabic, for
his major works.

21. 1961: 16-17: 'Calculation, again, is certainly a useful tool for logic, but only as
facilitating new insights into logical interconnection. It is undeniable that such insights,
e.g., in the logic of relations, have been reached by its means, and the convenience and
accuracy of this instrument are so great that no serious logician can now dispense with
it. But we would not go so far as to say that calculation has *at every point* allowed
mathematical logic to surpass the older forms. Think for example of two-valued
prepositional logic: the essentially new features introduced by *Principia Mathematica*
are quite unimportant when we compare the scholastic treatment.

Once again the matter reduces to our insufficient knowledge of the earlier forms of
logic. For years people spoke of a supposed great discovery by De Morgan; then
Lukasiewicz showed that his famous law was part of the elementary doctrine of
Scholasticism. The discovery of truth-matrices was ascribed to Peirce, or even
Wittgenstein; Peirce himself found it in the Megarians. D. Ingalls found Frege's
classical definition of number in the Indian Mathuranatha (17th century). And then we
are all too well aware that we know, as has been said, only fragments of Scholastic and
Indian logic, while much more awaits us in manuscripts and even in unread printed
works. The Megarian-Stoic logic, too, is lost, except for a few poor fragments
transmitted by its opponents.

'Also highly relevant to the question of the continual progress of logic throughout its
history is the fact that the earlier varieties are not simply predecessors of contemporary
logic, but deal in part with the same or similar problems though from a different
standpoint and by different methods.'

22. Here we must note Bochenski's judgment (1961: 268) of the unique place of Frege in the
Parthenon of modern and contemporary 'symbolic logicians': 'His *Begriffsschrift* can
only be compared with one other work in the whole history of logic, the *Prior Analytics*
of Aristotle. The two cannot quite be put on a level, for Aristotle was the very founder
of logic, while Frege could as a result only develop it [cf. the more extreme view of
Thomas 1967: 961]. But there is a great likeness between these two gifted works. The
Begriffsschrift, like the *Prior Analytics,* contains a long series of quite new insights, e.g.,
Frege formulates for the first time the sharp distinction between variables and

constants, the concepts of logical function, of a many-place function, of the quantifier; he has a notably more accurate understanding of the Aristotelian theory of an axiomatic system, distinguishes clearly between laws and rules, and introduces an equally sharp distinction between language and meta-language, though without using these terms; he is the author of the theory of description; without having discovered, indeed, the notion of a value, he is the first to have elaborated it systematically. And that is far from being all.

'At the same time, and just like Aristotle, he presents nearly all these new ideas and intuitions in an exemplarily clear and systematic way. Already in the *Begriffsschrift* we have a long series of mathematico-logical theorems derived from a few axioms "without interruption" (*l ckenlos*), as Frege says, for the first time in history. Various other mathematical logicians at the same time, or even earlier, expounded similar ideas and theories, but none of them had the gift of presenting all at once so many, often quite original, innovations in so perfect a form.

'It is a remarkable fact that this logician of them all had to wait twenty years before he was at all noticed, and another twenty before his full strictness of procedure was resumed by Lukasiewicz. In this last respect, everything published between 1879 and 1921 fell below the standard of Frege, and it is seldom attained even today. The fate of Frege's work was in part determined by his symbolism. It is not true that it is particularly difficult to read, as the reader can assure himself from the examples given below; but it is certainly too original, and contrary to the age-old habits of mankind, to be acceptable.'

23. 'Perihermenias' is bound to be, for a while anyway, an especially clarifying term for semiotic historiography in any premodern period. In the renaissance, as indeed very early in the Latin population we have tried to focus on above, this twofold Greek title ('Peri Hermenias') came to exist semiotically in single-term form early (at least pre-1477), as Zigliara (1882: p. 3 of the arabic numbers starting with 8, counting backwards to 'cccxlvi') shows, in the spelling 'peryermenias'. This already is a semiotic phenomenon to be noted and considered carefully, as Dr. Herzfeld pointed out in discussions after the lecture. For in Greek, the late Latin single word, as used for example in Poinsot 1632, was definitely *binary* in both semantic and syntactic structure, and the Greek original binary term was, from the earliest days of the integral naturalism in philosophy devolving from Aristotle, a subject of substantive controversy, as can be seen from Zigliara (1882: 7 note *ā*): *'Interpretatio, secundum Boethium* etc. Haec Boethius habet Prooemio Edit. prim, in lib. *De interpretatione* (Opp. — Basileae 1570, pag. 215). *Interpretatio (ἀñìçíâßá) est vox significativa, per seipsam aliquid significans.* Et quia non solum *propositio* (quae est vox complexa), sed *Qtisim Momen* et *verbum* (quae sunt voces; incomplexae) aliquid per seipsa significant, sequitur quod, iuxta sententiam .Boethii, ab eodem expressam *(ib.), nomen* et *verbum* subjectum Peri hermeneias constituant non solum prput sunt partes *enunciationis* seu proppsitipnis, sed etiarn secundum se sumpta. — Sed Boethio haud consentits. Thomas, recte nptando quod ille interpretatur, proprie loquendo, qui exponit aliquid esse verum vel falsum. Ergo *interpretatio* proprie non erit quaelibet vox per se significans, sed quae et per se, significat et simul per se continet enunciatque yerum vel falsum. Hoc autem prpprjum est vocis complexae seu orationis, imo solius *orationis enunciativae,* quatenus haec distinguitur ab oratione optativa et imperativa et aliis, ut in hoc ipso numero optiine dicit Angelicus. LJnde colligitur quod titulus *ðåñß åñìçíåßáò,* qui de verbo ad verbum vertitur *De, interpretatione,* philosophice reddi hire merito potest, *De enunciativa oratione.* Hinc. Ammonius in prplogo sui Commentarii in librum *Peri hermeneias* dicit: "Z)e *interpretatione* librum inscripsit, perinde quasi hoc modo, an *De enunciativa*

inscribas *oratione,* nihil intersit: *ἀδἀἀñáφ̂ä ôï âéâëβïí̈ ð̂âñ̂β ἀñ̀ìçíâ̂ßáò, ὑò ïṏäÝí̈ äéáöåñ̈ïí̈* Þ *üíôüὸ Ýð̈éâ̈ñ̈Üöåí̈, Þ ð̂âñ̂β ôïṏ áð̈ïöáíô̂éê̈ïṏ ëüāïṏ''* (Venetiis, 1546, interprete Bartholomaeo Sylvano, fol. I, col. 3. — ib. graec. ed. cit. Aldi Pii Manutii).

'Attamen quamvis oratio enunciativa constituat subjectum huius tractatus, non de illa solummodo hie agitur, sed etiam de nomine et verbo, aliisque ad ipsam enunciativam orationem pertinentibus. Ratio est quia proprium scientiae est cognitio sui subject! ad quod tanquam ad suum finem ordinatur. Non autem possibile est cognoscere naturam cuiusque subject! nisi cognoscantur partes ex quibus constituitur (sicut ad cognoscendam hominis naturam necesse est cognoscere eius partes, turn physicas, nempe animam et corpus organicum, turn metaphysicas, scilicet *animalitatem* et *rationalitatem)',* neque plene herum cognoscitur ipsum subjectum, cognita ipsius natura, nisi etiam cognoscantur eius proprietates, seu propriae passiones, quae naturam ipsam subjecti consequuntur (eo modo quo capacitas seiend! in homine sequitur eius naturam rationalem). Atqui partes seu principia ex quibus constituitur oratio enunciativa sunt *nomina* et *verba.,* Ergo et de istis et de proprietatibus enunciationis, prout ordinantur ad principale subjectum quod est ipsa enunciativa oratio, determonat ber iste Peri hermeneias.

'Quibus constitutis, non est difficilis solutio quaestionis, quae quoad titulum *ð̂âñ̂β ἀñ̀ìçíâ̂ßáò,* praefixum huic libro ab ipso Aristotele, uti videtur, penes veteres agitabatur, quamque iterum recentiores versant. Aspasius enim et Alexander Aphrodisiensis, uti refert Boethius in Prologo secundae Ed. Commentarior. in hunc librum (pag. 291-2), *de oratione* hie tractari ab Aristotele iuxta titulum affirmabant: nam si proferre aliquid oratione, ut aiunt ipsi, interpretari est, *De interpretatione* ber veluti de oratione perscriptus est. Unde Alexander imperfectum addebat esse titulum praefixum; quia cum *ἀñ̀ìçíâ̂ßá* sonet orationem quamcumque, nonnisi de oratione enunciativa, idest de oratione in qua continetur verum vel falsum in libro est sermo. "Sed, *respondet Boethius,* qui (Alexander) semel solam orationem interpretationis nomine vocari recipit, in intellectu quoque ipsius inscriptionis *(nempe ð̂âñ̂β ἀñ̀ìçíâ̂ßáò)* erravit. Cur enim putaret imperfectum esse titulum, quoniam nihil de qua oratione disputaret adiecerit; ut si quis interrogans quid est homo, alio respondente animal, culpet ac dicat imperfecte ilium dixisse quid sit, quoniam non sit omnes differentiae persecutis? ... Eodem quoque modo et de oratione, si quis hoc concedat primum, nihil aliud interpretatione dici nisi orationem, cur qui de interpretatione inscripserit, et de qua interpretatione dicat non addiderit, culpetur? Satis est enim eum libri titulum etiam de aliqua continent! communione fecisse, ut nos eum et de *nominibus* et *verbis* et de *orationibus,* cum haec omnia uno interpretationis nomine continerentur, supra fecisse docuimus, cum hie ber ab eo *(Aristotele)* de interpretatione nominatus est" (Loc. supra cit. ex II Edit.). Neque Alexandro neque Boethio subscribit s. Thomas: titulus non est imperfectus, quia *ἀñ̀ìçíâ̂ßá* non orationem quamcumque, sed illam quae continet verum vel falsum seu *enunciativam* proprie significat; neque est titulus communis nomini, verbo et orationi, quia *ἀñ̀ìçíâ̂ßá* non est *ëÝí̈éò,* nempe dictio vel oratio quaecumque per se significans, sed significans verum vel falsum, ut dictum est: proindeque non comprehendit nomina et verba praecise quia per se significant aliquid, sed quatenus sunt partes *ôçò̀ ἀñ̀ìçíâ̂ßáò,* orationis videlicet interpretativae seu enunciativae, a qua, sicut a principaliori subjecto ber denominatur (Cf. Albert Magn. in lib. I *Perihermeneias* tract. I, c. l, p. 237).

Theodor. Waitz, *Aristotelis Organon graece,* p. I, pag. 323, Lipsiae 1844, — recitat et approbat sententiam Aquinatis aientis, nomen et verbum magis interpretationis principia esse quam interpretationes; verum loquens postea de Gumposch ait: "Titulum libri plane ineptum judicat (Gumposch) quem equidem fern posse putaverim, quum

åñìçíåßá de communicatione sermonis intelligitur, cuius principia in hoc libro traduntur" (Ib. pag. 324). Adde quod haec s. Thomae explicatio videtur baud satis conformis ipsi Aristoteli. In libro enim *De respiratione* cap. XI ait: "In quibusdam lingua et ad percipiendos sapores et ad formandum sermonem, êáé ðñïò ôçí Ýñìçíåßáí, *(natura)* utitur." Hoc loco, sicut et II *De anima,* cap. VIII, n. 10, Ýñìçíåßáí pro sermone usurpat Aristoteles; et pro elocutione sumit in libro *De rhetorica* ad Alexandrum capp. XXIII et XXIV. Quibus cohaerenter s. Isidorus in libro II *Originum* seu *Etymologiarum,* cap. XXVII, *De perihermeniis Aristotelis* loquens, ait: "Omnis elocutio conceptae rei interpres est; inde Perihermeniam nominal *(Aristoteles)* quam interpretationem nos appellamus." — Hisce de causis nuperus auctor libri *De logica Aristototelis* existimat titulum Peri hermeneias verius verti *de sermone,* non quidem generice accepto, prouti nempe est signum quodlibet sensibilc manifestativum passionum animae (ut sumitur loco citato ex libro *De respiratione),* sed prouti strictiori sensu assumitur ad efformandas diversas propositiones.

'Quae omnia, deducta ex ipso vocabulo ðåñß åñìçíåßáò non infirmant, meo judicio, sententiam s. Thomae. Etenim cum, philosophice loquendo, verum sit nomen et verbum, ex quibus enunciati componitur, esse potius principia interpretationis quam interpretationes, sequitur quod interpretatio, åñìçíåßá, proprie orationem in genere et magis etiam proprie orationem enunciativan designet. — Praeterea concedimus quod elocutio conceptae rei interpres est; sed ea de qua in hoc tractatu agitur, elocutio est non rhetorica sed philosophica vel dialectica (ut ex Alexandro refert Boethius loc. cit.), quae est idem ac enunciatio, qua mens conceptam rei veritatem aut falsitatem manifestat. Et ideo *sermo* manifestativus conceptuum mentis suam perfectionem propriumque finem non attingit nisi in enunciatione. Unde merito s. Thomas dicit åñìçíåßáí hoc est *interpretationem* sumi ab Aristotele pro *enunciatione* in titulo huius libri. — Aegidius Columna, s. Thomae discipulus doctissimus: "Hie, *inquil,* intendit determinare de compositione simplicium quidditatum, scilicet de enunciatione sive interpretatione. Et in hoc patet subjectum huius libri scilicet interpretatio … Et, si obiiciatur: interpretatio est locus dialecticus; ergo non est subjectum in hoc libro; dicendum quod locus dialecticus est prout unum nomen exponitur per alia nomina; ut *philosophus* per hoc quod est *amator sapientiae.* Sed in hoc libro est subjectum prout est idem quod enunciatio. Unde neque nomen per se, neque verbum dicitur interpretatio, quae sunt partes interpretationis; et interpretatio idem est quod enunciatio" (In lib. *Periherm,* Exposit. in princ. — Venetiis per Simonem De Lucre 1507 fol. 47, verso, col. I). Nempe Aegidius vestigia premit Magistri, quern, ut in Praefatione diximus, sub nomine *Expositors* frequentissime citat.'

It is not hard to conjecture well in view of all this why Poinsot, in commenting on the 'perihermenias' books as he did, resorted to flatly *substituting* his general treatise for the traditional, i.e., Thomist, *commentary* grounded in the logics of terms and of propositions, when construing 'perihermenias' in a way 'philosophice reddi jure merito potest' yet at the precise opposite end of the spectrum from the contextually literal *commentary* which St. Thomas had undertaken *(circa* 1269) but had not yet completed at the time of his death in 1274. How strong the line of interpretation begun by Aquinas was can be gathered from the fact that it became for a while almost customary for other Dominicans up to Cajetan's time (i.e., early sixteenth century) to set themselves to complete St. Thomas's unfinished commentary as he would have himself completed it in life, as appears in Spiazzi's summary (1955: xi~xii): Opus istud *Peri hermeneias,* quod apud graecos unico libro continetur, in duos libros a latinis interpretibus divisum passim reperitur: quorum primus priora novem capita, reliqua quinque (X-XIV) alter complectitur. Hanc divisionem sequutus S. Thomas integrum primum librum exposuit,

sed in alterum nonnisi duas lectiones scripsit super primam partem capitis X. — Piani editores hanc in fine notam ponunt: *Commentariorum d. Thomae Aquinatis, quae ob eins mortem incompleta manserunt, finis.* At mortem non fuisse in causa cur opus non compieverit S. Doctor contendit Echardus, inquiens, vel quod nimiae occupationes obstiterunt, vel potius iuvenis ille et sapiens Praepositus forsan praesens plura non postulavit, religionique habuit maioribus intentum in his tyronum propriis diutius distinere. — Addit De Rubeis quod *opus incompletum mansit, nee ab alio suppletum:* quae ultima verba quo sensu dicantur a viro eruditissimo baud facile intelligitur. Bum namque non latuit a Caietano nostro fuisse suppletum, quod in Commentariis S. Thomae desideratur: quod Caietani supplementum pluries typis editum huic Editioni adnectimus. Verum et longe ante Caietanum nonnulli incompletum Angelici opus supplere moliti sunt. In Veneta *Peri hermeneias* editione 1477, fol. 21 verso, legitur: *Explicit sententia libri peryermenias secundum sanctissimum doctorem Thomam de Aquino.* Deinde fol. 22 recto: *Hoc quodsequitur est secundum expositionem Gratiadeide Esculo, Ordinis Praedicatorum. Et per eum completur lectura haec: nam S. Thomas non plusfecit morte praeventus.* Incipit: *Deinde cum dicit: Similiter autem se habet, distinguit enunciationes, quae accipiunt pro subiecto nomen finitum universaliter sumptum* etc. Denique fol. 32 verso: *Explicit supplementum in librum secundum Periermenias secundum Gratiadeum de Esculo Ordinis Praedicatorum.* Floruit Gratiadeus, iuxta Leandrum Albertum, ad annum 1341, et eximius fuit, inquit Echard, et Celebris sua aetate philosophus et theologus *(Scriptor. Ord. Praedic.* ad ann. 1341, torn. I, pag. 603). Supplementum Gratiadei extat etiam in alia Veneta editione 1495, sed additur *ex commentariis* eiusdem Auctoris *in eosdem libros Aristotelis* excerptum fuisse (fol. 15 verso). Denique in tertia editione pariter Veneta 1496, fol. 15 recto dicitur: *Plures eiusdem Ordinis* (Praedic.) *doctores clarissimi suppleverunt,* quae nempe deerant Commentario S. Thomae. Revera in codice Urbinate post ultimam S. Thomae lectionem, haec leguntur fol. 233 verso: *Hucusque scripsit S. Thomas de Aquino Ordinis Praedicatorum. Ea* vero *quae secuntur scripsit frater Robertus de Vulgarbia Ordinis eorumdem Praedicatorum.* Incipit: *Similiter autem se habet. In hac pane multiplicat oppositionem in universalibus* etc. Desinit fol. 241 verso, col. 2: *Vel de eodem in diversis tempore.* Turn: *Laus tibi Christe. Explicit expositio secundi libri Periarmenias* sit 5. *Thomae de Aquino. Sed finita fuit per magistrum Roberturn de Vulgarbia Ordinis eorumden Praedicatorum. Finis.* Fragmentum huius supplement!, sed sine auctoris nomine, habetur etiam in cod. Vatic. 2115; ex quo eiusdem antiquitas constituitur: codex enim est labentis saeculi XIII. Codex Parisiensis 16154 habet et ipse fragmentum, sine nomine auctoris, alterius supplementi cuius specimen exhibeo in fine Commentarii S. Thomae.'

References

(Historically layered by authors, with some annotations)

Acknll, J. F. (1963). Translations *of Aristotle's Categories and De Interpretation,* with notes. Oxford: Clarendon Press.

Aquinas, Thomas (c. 1255-1259). *In librum Boetii de Trinitate expositio,* cura et studo M. Calcaterra, in *Opuscula Theologica,* ed. Raymundus M. Spiazzi, Vol. II, pp. 313-389. Turin: Marietti, 1954. For the dating of this work I have followed Mauer 1958: vi, q.v.

—(c. 1269). *In decent libros ethicorum Aristotelis ad Nichomachum expositio,* cura ac studio Raymundi Sprazzi. 3rd ed. Turin: Marietti, 1964.

—(c. 1269-1272). *In libros posteriorum analyticorum expositio.* Cum textu ex recensione leonina cura et studio R. M. Spiazzi. Turin: Marietti, 1955.

—(c. 1269-1274). Uncompleted commentary (after Book II lectio 14: see note 23 above and see entry for Cajetan 1496). *In Aristotelis libros perihermenias expositio,* pp. 5-144 of the Spiazzi edition based on the leonine text (1882) of this commentary together with that of St. Thomas on the *Posterior Analytics.* Turin: Marietti, 1955. English trans, in Oesterle 1962: 17-137.

Aristotle (c. 360-330 B.c.). *Organon,* in McKeon 1941 (q.v.): 1-212. Chronologizing based on Gauthier 1970, as follows:

—(c. 360). *Categories,* pp. 1-37 (complete; Edghill trans.).

—(c.353a)· *Topics,* pp. 187-206 (incomplete; Pickard-Cambridge trans.).

—(c.353b). *Refuting Sophisms,* pp. 207-212 (incomplete; Pickard-Cambridge trans.).

—(c. 348-7a). *Prior Analytics,* pp. 62-107 (incomplete; Jenkinson trans.).

—(c. 348-7b). *Posterior Analytics,* pp. 108-186 (complete; Mure trans.).

—(c.330). *On Interpretation,* pp. 38-61 (complete; Edghill trans.).

It should be noted that, in some ways more consistent than the Latin development of Aristotle's notion of Logic as the instrument common to *all* thought, it was the custom in the Arabic tradition of Aristotelian commentary to include the *Rhetoric* (composed c. 335-334) and the *Poetics* (c. 355-334) as part of the *Organon* itself, corresponding, as it were, to the logic involved in practical knowledge (see Figure 1 in the text above).

Arnauld, Antoine and Nicole, Pierre (1662). *La Logique, ou l'Art de Penser.* Paris.

Ashley, Benedict (1973). Change and process. In *The Problem of Evolution,* John N. Deely and Raymond J. Nogar (eds.), 265-294. Indianapolis, Ind.: Hackett Publishing Co.

Ashworth, E. J. (1974). *Language and Logic in the Post-Medieval Period.* Dordrecht, Holland: Reidel.

Saint Augustine of Hippo (c. 397-426). *De doctrina Christiana libri quattuor* (On Christian Doctrine')· In *Patrologiae Cursus Completus,* ed. J. P. Migne, *Series Latina* (P.L.), Volume 34, cols. 15-122.

Averroes (post 1181[?]). *Commentarium Magnum in Aristotelis De Anima Libros,* ed. by F. Stuart Crawford. Cambridge, Mass.: The Mediaeval Academy of America, 1953.

Banez, Domingo (1528-1604) (1618). *Institutiones minores dialecticae, hoc est summulae.* Cologne; posthumous publication.

Bochenski, I. (1961). *A History of Formal Logic,* translated and edited 'with the author's full concurrence' by Ivo Thomas from *Formale Logik* (Freiburg: Verlag Karl Alber, 1956). New York: Chelsea Publishing Company.

Boehner, Philotheus (1957). Introduction. To *Ockham. Philosophical Writings,* edited and presented in bilingual format, ix-lix. London: Thomas Nelson and Sons, Ltd.

Boethius, Anicius Manlius Severinus. (The presentation of Boethius's works in Migne 1891 [q.v.], P. L. Vol. 64, is here chronologized and evaluated textually solely on the basis of Cappuyns 1937, q.v.)

—(ante 509). *Dialogi in Porphyrium a Victorino translati* (ante 363).

—(509-510). *Commentaria in Porphyrium.*

—(510). *In categorias Aristotelis libri quattuor.*

—(511). *In librum Aristotelis de interpretatione Commentaria minor.*

—(post 51 la). *Interpretatio priorum Analyticorum Aristotelis:* version authored by James of Venice, c. 1128.

—(post 51 Ib). *Interpretatio posteriorum Analyticorum Aristotelis:* version authored by James of Venice, c. 1128.

—(post 5lie). *Interpretatio Topicorum Aristotelis:* also by James of Venice, c. 1128.

—(post Slid). *Interpretatio Elenchorum Sophisticorwn Aristotelis:* version of James of Venice, c. 1128.

—(511-513). *In librum Aristotelis de interpretatione Commentaria major.*

—(512-513a). *De Syllogismo categorico libri duo.*

—(512-513b). *Introductio ad Syllogismos Categoricos* (in some manuscripts, *Antepraedicamenta).* Perhaps a 2nd ed. of 512-513a, above.

—(soon post 513a). *De Syllogismo hypothetico libri duo.*

—(soon post 513b). *Liber de divisione.*

—(513-515). *Commentaria in Topica Ciceronis.*

—(c. 515). *De Differentiis topicis.* The two tracts, *De rhetorica cognatione and Locorum rhetoricorum distinctio,* Migne 1891, P.L. 64, cols. 1217-1222 and 1222-1223, respectively, are only extracts of Book IV.

—(c. 520). *De Trinitate,* or, properly, *Liber de Sancta Trinitate* (more fully: *Quomodo trinitas unus deus ac non tres dii).*

—*Liber de diffinitione* Spurious (authored by Marius Victorinus, born c. 280-300, died c. 363).

Bosserei, J. B. (1615). *Synopses in quibus doctrina dialectica R.' P.' Petri Fonseca ad Ordinem Aristotelicum revocatur, Anno Domini 1615.* University of Graz MS 133; Ferreira Gomes 1964, II: 779-861.

Cajetan, Thomas de Vio (1496). *Commentaria in reliquum libri secundi peri hermenias,* in *Sancti Thomae Aquinatis Opera Omnia,* Leonine ed., Tomus Primus, ed. Zigliara, pp. 87-128. Rome: 1882. English translation in Oesterle 1962: 139-255.

Cappuyns, M. (1937). Entry 'Boece' in *Dictionnaire d'Historie et de Geographie Ecclesiastiques,* tome neuvieme, columns 347-380. Paris: Librarie Letouzey.

Carnap, Rudolf (1937). *The Logical Syntax of Language,* trans, with additions from *Logische Syntax der Sprache* (Vienna, 1934). London: Routledge and Kegan Paul.

Chevalier, Ulysse (1907). *Repertoire des Sources Historiques du Moyen Age. Bio-Bibliographie* (nouvelle ed. refondue, corrigee et äug.), Deuxieme Volume, entry for 'Jacques clerc ä Venise, traducteur', col. 2330. Paris: Librairie Alphonse Picard et Fils.

Crystal, David (1974). Paralinguistics. In *Current Trends in Linguistics,* Vol. 12, *Linguistics and Adjacent Arts and Sciences,* T. A. Sebeok (ed.), 265-295. The Hague: Mouton.

Deely, John N. (1971). Animal intelligence and Concept-formation. *The Thomist* XXXV (January), 43-93.

—(1972). The ontological status of intentionality. *The New Scholasticism* XLVI, 220-233.

—(1974). The two approaches to language: Philosophical and historical reflections on the point of departure of Jean Poinsot's semiotic. *The Thomist* XXXVII (4) (October), 856-907.

—(1975a). Modern logic, animal psychology, and human discourse. *Revue de I'Universite d'Onawa* 45(1) (janvier-mars), 80-100.

—(1975b). Reference to the non-existent. *The Thomist* XXXIX (2) (April), 253-308.

—{1976). The doctrine of signs: Taking form at last. *Semiotica* 18(2): 171-193.

—(1977). 'Semiotic' as the doctrine of signs. *Ars Semeiotica* 1(3), 41-68.

—(1978a). Toward the origin of semiotic. In *Sight, Sound, and Sense,* T. A. Sebeok (ed.), 1-30. Bloomington: Indiana University Press.

—(1978b). What's in a Name? *Semiotica* 22(1/2), 151-181.

—(1978c). Semiotic and the controversy over mental events. ACPA *Proceedings* LII, 16-27.

—(1980). The non-verbal inlay in linguistic communication. In *The Signifying Animal.* Irnaengard Rauch and Gerald F. Carr (eds.), 201-217. Bloomington: Indiana University Press.

—(1982). Editorial afterword. To the bilingual edition of Poinsot's 1632 *Tractatus de signis,* at back of volume. Berkeley: University of California Press.

Eco, Umberto (1982?). Entry 'Aquinas', in the forthcoming *Encyclopedic Dictionary of Semiotics,* ed. Sebeok *et al.* The Hague: Mouton.

Ferreira Gomes, Joaquim (1964). Introducao, Estabelecimento do Texto, Tradugao e Notas for Fonseca 1564, q.v.

Fisch, Max H. (1977). Peirce's place in American thought. *Ars Semeiotica* 1/2, 21-37.

—(1980). Foreword. To *'You Know My Method': A Juxtaposition of Charles S. Peirce and Sherlock Holmes,* by Thomas A. Sebeok and Jean Umiker-Sebeok, 7-13. Bloomington, Indiana: Gaslight Publications.

Fonseca, Petrus ('Pedro da') (1564). *Institutionen dialecticarum libri octo* (Coimbra: Apud haeredes Joannis Blauij). I was able to consult, on microfilm, the 1611 Venice edition 'Apud Vincentium Florinum. MDCXF, which is the text cited in this essay. According to Ferreira Gomes (1964: vol. I, p. XLIV), an original of this edition can be seen in the library of the University of Munich. The most important edition of this work thus far is the bilingual presentation comparable to Poinsot 1632 (q.v.) of Joaquim Ferreira Gomes, *Instituicöes Dialecticas (Institutionum dialecticarum libri octo), 2* vols. Institute de Estudos Filosficos da Universidad de Coimbra, 1964. Discussion in Romeo 1979.

Frege, G. (1879). *Begriffsschrift,   eine der arithmetischen nachgebildete Formelsprache des reinen Denkens.* Halle.

Gauthier, Rene Antoine (1970). Introduction. To *L'Ethique a Nicomaque, traduction et commentaire,* par R. A. Gauthier et Jean Yves Jolif, Tome I, premiere partie. 12th ed., avec une introduction nouvelle. Paris: Beatrice-Nauwelaerts.

Gerhardt, C. J. (1961). Einleitung. To *Die philosophischen Schriften von Gottfried Wilhelm Leibniz,* C. J. Gerhardt (ed.), Band VII, 3-42, esp. 37ff. Hildesheim: Georg Olms.

Gilson, Etienne (1937). *The Unity of Philosophical Experience.* New York: Scribner's.

—(1952). *La Philosophie au Moyen Age. Des Origines Patristiques a la Fin du XlV^e Siecle.* 2nd ed., rev. et äug. Paris: Payot.

Herculano de Carvalho, Jose G. (1969). Segno e significazione in Joäo de Säo Tomas. In *Estudos Linguisticos,* Vol. 2, 129-168. Coimbra: Atläntida Editora.

Hubert, D. (1905). Über die Grundlagen der Logik und der Arithmetik. In Verh. d. 3. Int. Mathem.-Kogr., 174-185. Leipzig.

Hillgarth, Jocelyn Nigel (1967). 'Lull, Ramon' in *The Encyclopedia of Philosophy,* Paul Edwards (ed.), Vol. 5, 107-108. New York: Macmillan.

—(1971). *Ramon Lull and Lullism in Fourteenth Century France.* Oxford: Clarendon Press.

Jevons, W. S. (1864). *Pure Logic, or the Logic of Quality apart from Quantity.* London.

Jourdain, A. (1843). *Recherches critiques sur l'äge et Vorigine des traductions latine d'Aristote.* Paris.

Kneale, William and Kneale, Martha (1962). *The Development of Logic.* London: Oxford University Press.

Kretzmann, Norman (1979). *Pauli Veneti Logica Magna Prima Pars Tractatus de Terminis,* ed. with an English trans, and notes. Oxford: The British Academy.

Kristeller, Paul Oskar (196la). The Aristotelian tradition. In *Renaissance Thought,* 24-47. New York: Harper.

—(1961b). Humanism and Scholasticism in the Italian Renaissance. In *Renaissance Thought,* 92-119. New York: Harper.

Leibniz, G. W. F. (The chronology and pagination references for the following list of Leibniz's works relevant to the present essay is based on the edition of Renate Vollbrecht, *Gottfried Wilhelm Leibniz Opera Philosophica quae exstant latino gallica germanica omnia,* instruxit J. E. Erdmann: Faksimiledruck der Ausgabe 1840 durch weitere Testucke

ergangt und mit einem Vorwort versehen von Renate Vollbrecht. Meisenheim: Scientia Aalen, 1959. For the questionable dates, Gerhardt 1961 was further consulted).

—(1666). Dissertatio de arte combinatoria cum appendices. In Vollbrecht, pp. 6-44.

—(1677). Dialogus de connexione, inter res et verba. In Vollbrecht, pp. 76-78.

—(1685-1686[?]a). De scientia universal! seu calculo philosophico. In Vollbrecht, pp. 82-85.

—(1685-1686[?]b). Initia scientiae generalis de nova ratione instaurationis et augmentationis scientiarum, ita ut exiguo tempore et negotio, si modo velint homineo, magna praestari possint ad felieitatis humanae incrementum. In Vollbrecht, pp. 85-86.

—(1685-1686[?]c). De natura et usu scientiae generalis. In Vollbrecht, pp. 86-88.

—(1685-1686[?]d). Synopsis libri, cui titulno erit: Scientia nova generalis pro instauratione et augmentis scientiarum ad publicam felicitatem. In Vollbrecht, pp. 88-89.

—(1685-1686[?]e). Guilielmi Pacidii plus ultra, sive initia et specimino scientiae generalis etc. In Vollbrecht, p. 89.

—(1685-1686[?]f). Guilielmi Pacidii initia et specimina scientiae generalis. In Vollbrecht, pp. 90-91.

—(1685-1686[?]g). In specimina Pacidii introductio historica. In Vollbrecht, pp. 92-94.

—(1685-1686[?]h). Fundamenta calculi ratiocinatoris. In Vollbrecht, pp. 92-94.

—(1685-1686[?]i). Non inelegans specimen demonstrandi in abstractis. In Vollbrecht, pp. 94-97.

—(1685-1686[?]j). Addenda ad specimen calculi universalis. In Vollbrecht, pp. 98-99.

—(1685-1686[?]k). De veritatibus primis. In Vollbrecht, p. 99.

—(1685-1686[?]l). Definitiones Logicae. In Vollbrecht, pp. 100-101.

—(1696). Schreiben an Gabriel Wagner vom Nutzen der Vernunftkunst oder Logik. In Vollbrecht, pp. 418-426.

—(1704). Completion of *Nouveaux Essais sur l'entendement humain,* ms. not published till 1765.

Levy-Bruhl, L. (1899). Essay on Descartes. Added 'as it appeared in the author's *History of Modern Philosophy in France* (Chicago: Open Court, 1899) by way of a, general introduction' to *The Meditations and Selections from the Principles of Rene Descartes,* trans, by John Veitch and published by Open Court of Chicago in 1905 under the editorship of T. J. McCormack, pp. vii-xxx.

Locke, John (1690). *An Essay Concerning Human Understanding. 2* vols. A. C. Fräser (ed.). New York: Dover, 1959.

Lombard, Peter (c. 1150). *Libri Quattuor Sententiarum* (The Four Books of the Sentences'). In *Patrologiae Cursus Completes,* ed. J. P. Migne, *Series Latina* (P.L.), Vol. 192, cols. 522-963. (One of the very earliest printed editions of this formerly ubiquitous work appeared in Venice: Vandelin Spire, 1477.)

Lull, Ramon (1274). Composition of the first version of the *Ars Magna,* the *Ars compendiosa inveniendi veritatem,* which 'has only once been published, by Salzinger' as the opening work in the eight-volume *Beau Raymundi Lulli Opera,* ed. Ivo Salzinger (Mainz, 1721-1742). The Catalan original *(Art abreujada d'atrobar veritat)* is lost but it certainly existed; it is referred to by Lull, *Art demonslrativa,* c. 1275.' (Hillgarth 1971: 8 n. 32.)

Maritain, Jacques (1937). Logical algebra. Appendix I in the Imelda Choquette translation of *Petite Logique* (1923) published under the title *Formal Logic,* pp. 288-293. New York: Sheed and Ward.

—(1959). *Distinguish to Unite, or The Degrees of Knowledge,* trans, from the fourth French edition under the supervision of Gerald B. Phelan. New York: Scribner's. Original publication in French, 1932.

Maurer, Armand A. (1958). Introduction. To St. Thomas Aquinas. *The Division and Methods of the Sciences,* Questions V and VI of Aquinas, c. 1255-1259 (q.v.), trans, by Armand

Maurer, pp. vii-xxxvi. 2nd rev. ed. Toronto: Pontifical Institute of Medieval Studies.

McKeon, Richard (1941). *Selections from Medieval Philosophers,* Vol. I. New York: Scribner's.

Migne, J. P. (ed.) (1878-1889). *Patrologiae Cursus Completes, Series Latina* (P.L., customarily), 162 volumes. Paris.

—(1891). *Manlii Severini Boetii opera omnia, non solum liberalium disciplinarium, sed etiam majorum facultatum studiosis utilissima, mo et sine quibus Aristoteles in praecipuis locis intelligi non potest,* etc. (Bibliothecae Cleri universae), P.L. 64 (being the second of two volumes comprising hopefully the *versiones Boethii* extant to our time: see entry for Cappuyns).

Mill, John Stuart (1843). *System of Logic.* London.

Moody, Ernest A. (1967). The section, 'Medieval Logic', pp. 528-534, in the several-authored general entry, 'Logic, History of, pp. 513-571 in *The Encyclopedia of Philosophy,* Paul Edwards (ed.), Vol. 4. New York: Macmillan.

Nicole, Pierre: see entry for Arnauld, Antoine.

Ockham, William of *(inter* 1317-1328). *Summa Logicae.* Partial ed. by Philotheus Boehner. New York: St. Bonaventure, 1951-1954.

Oesterle, Jean (1962). Translation with Introduction (pp. 1-15), *Aristotle: On Interpretation. Commentary by St. Thomas and Cajetan.* Milwaukee: Marquette University Press.

Paulus Venetus ('Paul of Venice', c. 1369-1429). *Logica Magna, Prima Pars (tractatus de terminis),* microfilm of a Vatican Library early edition and the bilingual presentation by Norman Kretzman, 1979 (q.v.), were consulted but not cited in preparing this essay.

Peano, G. (1889). *Arithmetices principia, novo methodo exposita.* Turin: Augustae Taurinorum.

Peirce, Charles Sanders (1871). Review of Eraser's Edition of the Works of George Berkeley, in *The North American Review* 113 (October), 449-472, as reproduced in *Collected Papers,* Vol. VIII, 9-38. References above are to the CP reprint.

Poinsot, John (1631). *Textus Summularum* seu *Artis Logicae Prima Pars* (Alcala, Spain). The Reiser edition of this work (Volume I; Turin: Marietti, 1930: pp. 1-247), was used in preparing this work.

—(1632). *Tractatus de Signis,* within the *Artis Logicae Secunda Pars* (Alcala, Spain), as explained in Deely 1982, q.v. The Reiser edition of this work (Volume I; Turin: Marietti, 1930: pp. 249-839) was used in preparing this essay.

—(1631-1635). *Cursus Philosophicus,* comprising:

—(1631). *Artis Logicae Prima Pars* (Alcala, Spain).

—(1632). *Artis Logicae Seconda Pars* (Alcala, Spain).

—(1633). *Naturalis Philosophiae De Ente Mobili in Communi* (Madrid, Spain).

—(1634). *Naturalis Philosophiae De Ente Mobili Corruptibili* (Alcala, Spain).

—(1635). *Naturalis Philosophiae De Ente Mobili Animato* (Alcala, Spain).

Porphyry (c. 271). *Porphyrii Isagoge et in Aristotelis Categories Commentarium* (Greek text), ed. A. Busse (Berlin, 1887). English trans, by Edward G. Warren, *Porphyry the Phoenician: Isagoge.* Toronto: Pontifical Institute of Mediaeval Studies, 1975.

Port-Royal Logic: see Arnauld, Antoine.

Preziosi, Donald (1979). *The Semiotics of the Built 'Environment.* Bloomington: Indiana University Press.

Randall, John Herman, Jr. (1962). *The Career of Philosophy,* Volume I, *From the Middle Ages to the Enlightenment.* New York: Columbia University Press.

Ransdell, Joseph (1980). Semiotic and linguistics. In *The Signifying Animal,* I. Rauch and G. F. Carr (eds.). 135-185. Bloomington: Indiana University Press.

Rauch, Irmengard (1980). Between linguistics and semiotics: Paralanguage. In *The Signifying*

Animal, I Rauch and G. F. Carr (eds.), 284-289. Bloomington: Indiana University Press.

Rauch, Irmengard and Carr, Gerald F. (eds.) (1980). *The Signifying Animal.* Bloomington: Indiana University Press,

de Rijk, Lambertus M. (1962). *Logica Modernorum. A Contribution to the History of Early Terminist Logic.* Vol I, On the Twelfth Century Theories of Fallacy'; Vols. II and III, The Origin and Early Development of the Theory of Supposition'. Assen, Netherlands: Koninlijke Van Gorcum and Comp.

Romeo, Luigi (1979). Pedro da Fonseca in Renaissance semiotics: A segmental History of footnotes. *Ars Semeiotica* 11(2), 187-204.

Schröder, E. (1877). *Der Operationskreis des Logikkalkuls.* Leipzig.

—(1890-1905). *Vorlesungen über die Algebra der Logik.* Leipzig: 1,1890; II/1, 1891; III, 1895; II/2, 1905.

Scruton, Roger (1980). Possible worlds and premature sciences. In *The London Review of Books, 1* February 1980, reviewing Donald Preziosi and Umberto Eco, 1980, without much good to report, but without much depth, either.

Sebeok, Thomas A. (1974). Semiotics: A survey of the state of the art. In *Linguistics and Adjacent Arts and Sciences (Current Trends in Linguistics,* ed. by T. A. Sebeok, 12), 211-264. The Hague: Mouton. Reprinted in Sebeok 1976 (q.v.): 1-45.

—(1975). The semiotic web: A chronicle of prejudices. *Bulletin of Literary Semiotics* 2 (1975), 1-63. Reprinted with essential corrections and additions in Sebeok 1976 (q.v.): 149-188.

—(1976). *Contributions to the Doctrine of Signs.* Bloomington: Indiana University RCLSS Publications.

Soto, Dominic (1494-1560) (1529). *Summulae.*

—(1544). *In dialecticam Aristotelis Commentarii.*

Spiazzi, Raymundus (1955). Introductio Editoris. To his edition of Aquinas, c. 1269-1274 (q.v.), pp. v-xvii.

Suarez, Francis (1605). *De Sacramentis.* Venice: Apud Societatem Minimam. Vol. **XX** of the Opera Omnia editio nova, a Carolo Berton' (Paris: Vives, 1860), was used in preparing the present essay.

Sullivan, John Edward (1963). *The Image of God. The Doctrine of St. Augustine and Its Influence.* Dubuque, la.: The Priory Press.

Thomas, Ivo (1967). 'Logic, History of, in *The New Catholic Encyclopedia,* Vol. 8, 958-962. New York: McGraw-Hill.

Warren, Edward W. (1975). Introduction. To his translation of *Porphyry the Phoenician: Isagoge,* pp. 9-25. Toronto: Pontifical Institute of Mediaeval Studies.

Weisheipl, James A. (1965). Classification of the Sciences in Mediaeval Thought. *Mediaeval Studies* XXVII, 54-90.

Whewell, William (1837). *History of the Inductive Sciences, From the Earliest to the Present Time,* in 3 volumes. London.

—(1840). *Philosophy of the Inductive Sciences.* London.

Whitehead, Alfred North and Russell, Bertrand (1910-1913). *Principia Mathematica,* 3 vols. London: Cambridge University Press.

Zigliara, Thomas M. (1882). Synopses and Annotations to the Tomus Primus of the leonine *opera omnia sancti Thomae Aquinatis* (see entry for Aquinas, c. 1269-1274).

John N. Deely (b. 1942) is Chairman of the Department of Philosophy at Loras College, Dubuque, Iowa. His principal research interests are semiotics, the early development of modern thought in late Latin scholasticism, the theory of communication and knowledge, and divisions of knowledge. His major publications include *The Tradition via Heidegger* (1971), *The Problem of Evolution: A Study of the Philosophical Repercussions of Evolutionary Science* (1973), and the bilingual edition of Poinsot's 1632 *Tractatus de signis* (forthcoming).