STOIC SYNTAX

The Structure of the ἀξιῶμα
in the Logic of the Old Stoa

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The most highly developed ancient Greek logical theory,
apart from Aristotle's, was that of the Stoics. Stoic logic
differed from Aristotelianism in that it was concerned with
propositions and inference-schemas rather than classes and
logically true matrices (Mates 2). It therefore included a
sophisticated syntactic theory which classified propositions
as simple or complex, identified the constituent parts of
propositions, and related these logical analyses to the struc-
ture of natural language.

Zeno of Citium, who was in the habit of holding discussions
under the Portico (Στόα) of Pisianax in Athens, founded the Stoic
school of philosophy around 300 B.C., and Chrysippus, its third
head, contributed a great deal to Stoicism about half a century
later. Stoic logic was itself an outgrowth of the Megarian or
'dialectical' school founded by Euclid of Megara, pupil of
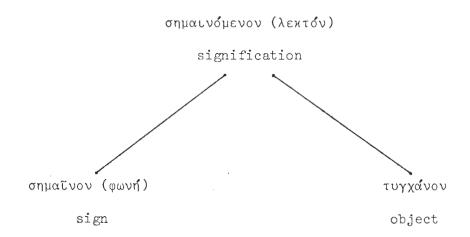Socrates, around 400 B.C. (Bocheński 107, Mates 5-7).

None of the works of the Old Stoic logicians survive, so
to reconstruct their theories we must rely on fragmentary accounts
given by later authors. Sextus Empiricus (c.325 A.D.), a popular

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lecturer who devotes great effort to attacking other people's theories, gives an account of Stoic syntax in his Adversus mathematicos (abbreviated AM), but since he quotes Stoics only to refute them, his rendition of their thought is not likely to be completely fair. Diogenes Laërtius (abbreviated DL), who seems to have lived about the same time as Sextus or a bit earlier, includes in his life of Zeno a good, though brief, account of Stoic logic based on the work of Diocles Magnes, a scholar of the first century B.C. (Mates 9). In addition, there are many short but useful references to Stoic logic in other authors; von Arnim has assembled these in his four-volume Stoicorum veterum fragmenta (abbreviated SVF and cited by volume and fragment number).

Stoic philosophy is divided into physics, ethics, and logic. Stoics have compared logic to the fence encircling a field, or to the shell of an egg, or to the skeleton of an animal (DL VII.40). Logic, the science of discourse (λόγος), is what delimits and gives structure to philosophy. The science of discourse is in turn divided into rhetoric, the art of speaking well, and dialectic, the art of identifying true, false, and indeterminate statements (DL VII.41-42).

Like all ancient logical theory, Stoic logic has no artificial formal language, but rather concerns itself with the analysis of

natural language. The Stoics distinguished sense from reference and recognized the now familiar semantic triangle:

$$\text{σημαινόμενον (λεκτόν)}$$
$$\text{signification}$$

σημαῖνον (φωνή)   τυγχάνον

sign   object

The real-world object and the sign are corporeal (physical). The signification, however, is incorporeal; it is the intellectual association between sign and object. A foreigner listening to the Greek language but not understanding it is perceiving signs but not significations (AM VIII.11).

The distinction between sign and signification suggests the division of dialectic into what we may call semantics (περὶ σημαινομένου) and linguistics (περὶ φωνῆς, DL VII.43). The linguistic part of dialectic comprises the study of language per se. Stoic dialecticians developed grammar to an advanced level and made a lasting contribution to the Western grammatical

tradition. Robins observes, in fact, that 'some scholars

indeed would say that grammar in the modern sense only began

with them' (27; for more information see Pinborg). Stoic grammar,

however, lies outside the scope of this paper except insofar

as it relates to logical analysis.

Since the Stoics viewed language as natural rather than

conventional, their linguistics includes not only the study of

letters, syllables, and various kinds of grammatical excellence

(DL VII.56-59), but also such semantic matters as the signifi-

cations of the parts of speech (Lloyd 58). The three most important of

the Stoic parts of speech are the common noun, the name, and

the verb. The common noun (προσηγορία) signifies a κοινὴ

ποιότης, a quality or what-ness which several real-world objects have

in common, such as 'man' or 'horse'. The name (ὄνομα) signifies

an individual what-ness (ἰδία ποιότης) such as 'Diogenes' or

'Socrates'. The verb (ῥῆμα) signifies an unattached predicate

(κατηγόρημα), such as 'write' or 'speak', which can be attached

to any of several subjects. Other parts of speech are lumped

together under the categories of σύνδεσμος, comprising indeclin-

able words such as conjunctions and prepositions, and ἄρθρον,

comprising declinable elements such as pronouns and the article

(DL VII.58).

Semantics, for the Stoics, is the study of significations

(σημαινόμενα) or lecta (λεκτά). The lecton is the semantic unit

corresponding to a rational mental impression or image
(φαντασία λογική, DL VII.63). A rational impression, in turn,
is what a rational creature (i.e., a human being) obtains by
perceiving a real-world object; animals, lacking the faculty
of reason, get non-rational impressions of the same object
(DL VII.51).

Though all meanings are lecta, the Stoics distinguish
lecta which are complete and incomplete. A complete lecton
(λεκτὸν αὐτοτελές) is the meaning of a complete sentence,
whether declarative, interrogative, imperative, or something
else, and is composed of a subject (πτῶσις) and predicate
(κατηγόρημα), e.g., 'Socrates writes'. An incomplete lecton
(λεκτὸν ἐλλιπές) is a predicate by itself, such as 'writes';
for, on hearing 'writes' in isolation, we immediately ask,
'Who writes?' (DL VII.63). In later Stoic thought, and per-
haps in Old Stoic times as well, isolated subjects were also
considered to be incomplete lecta (AM VIII.11, Pinborg 80).
These two kinds of incomplete lecta together make up a complete
lecton.

Pinborg (81-83) carefully distinguishes the Peripatetic
use of πτῶσις as 'noun case' from the Stoic use of the same
term, which I have translated 'subject' and which, as he points
out, refers to a semantic as well as a grammatical function.

He cites the Stoic grammarian Clemens, who "solves the sophism
'What you say passes through your mouth. You say house.
Therefore a house passes through your mouth' by distinguishing
the σῶμα and the πτῶσις of the house, i.e., the house as existing
and the house as meaning" (81).

A predicate is an incomplete lecton which, with the addition
of a noun (usually in the nominative case), becomes complete.
Some predicates in the Greek language take a subject in a case
other than the nominative, and the Stoics carefully noted this
fact (Porphyrius, in SVF II.184). Again, many predicates take
an object as well as a subject, in the form 'X hears Y', 'X
sees Y', and so forth. The passive voice reverses the roles of
these two nominal elements, giving 'Y is heard (by X)' and the
like. There are verbs in Greek which are passive in form but
active in meaning (DL VII.64).

The Stoics distinguish many different kinds of complete
lecta. The most important of these is the proposition (ἀξίωμα,
not to be confused with the non-Stoic use of the term to mean
'axiom'). A proposition is that which is true or false, or
that which is capable of being denied, for instance 'It is day'.
Corresponding to every proposition is a yes-no question (ἐρώτημα)
such as 'Is it day?'. There are also questions (πύσματα) which
cannot be answered 'yes' or 'no', such as 'Where does so-and-so

live?'.   Other kinds of complete lecton include the imper-
ative ('Go thou to the waters of Inachus'), the vocative
('O most glorious son of Atreus, Agamemnon, lord of men!'),
and several ways of expressing emphatic exclamations, wishes,
and suggestions (DL VII.66-68; AM VIII.70-73).

Dialectic, the study of the true and the false, is naturally
concerned mostly with propositions. The Stoics classify prop-
ositions as simple and complex (ἁπλᾶ, οὐχ ἁπλᾶ; 'atomic' and
'molecular' in Mates's terminology). A simple proposition has
a definite truth-value: 'It is day.' A complex proposition
consists of two or more simple propositions, and the truth-
value of the whole does not necessarily depend on the truth-
value of any particular part. Thus, 'If it is day, it is day'
is true whether or not it is day (DL VII.68-69).

There are six kinds of simple propositions, of which three
are affirmative and three are negative. Affirmatives include
the definite (ὡρισμένον), in which something is predicated of
a deictic ('This man is walking'), and the indefinite (ἀόριστον),
in which the predication has an indefinite pronoun as subject
('Someone is walking'). The Stoics point out that the indefinite
is true if and only if the definite is true of some particular
individual (Mates 30). In addition, there is a third class of
affirmative propositions in which the subject is a name ('Socrates
is walking', AM VIII.100, DL VII.70).

The three kinds of negatives result from denying the whole proposition ('It is not the case that Socrates is walking'), the predicate ('This man is not-kind'), or the subject ('No one is walking'). Denying the subject is equivalent to denying the corresponding indefinite proposition ('It is not the case that someone is walking', DL VII.69-70).

The simplest of the kinds of complex proposition is the conjunction (συμπεπλημμένον), which is true if and only if both of the constituent simple propositions are true; the Stoic concept of conjunction is thus the same as the modern one.

However, for the Stoics, disjunction (διεζευγμένον) is the 'either-or' relation rather than disjunction in the modern sense, since "this connective (σύνδεσμος) guarantees that one simple proposition or the other is false" (DL VII.72), for instance 'Either it is day or it is night'. Of course, disjunction in the modern sense can be expressed in Stoic terms: 'P or Q' is equivalent to 'either (either P or Q) or (P and Q)'.

The conditional (συνημμένον) was a matter of some controversy among the Stoics (Mates 43), but Diogenes Laërtius, following Diocles Magnes, gives a definition equivalent to the modern definition of material implication: 'if P then Q' is true if and only if Q cannot be false while P is true (DL VII.73).

Thus, all of the following are true (Mates 44):

> If it is day, it is light.

> If it is night, it is dark.

> If the earth flies, then the earth exists.

('The earth flies' is taken to be false.)

The inference (παρασυνημμένον), 'Since P, therefore Q', is true if and only if (1) 'if P then Q' is true, and (2) P is true. (It follows that Q is also true.)

The Stoics distinguish implication from causation. The causal conclusion (αἰτιῶδες), 'Because P, thus Q' is true if the inference is true, and in addition P is actually the cause of Q. For instance, given that it is day and I am conversing, the inference 'Since it is day, I am conversing' is true, but the causal conclusion 'Because it is day, I am conversing' is false; the daytime is not the cause of my conversing.

The principles of Stoic syntax describe the construction of complex propositions not merely out of simpler propositions, but out of minimal meaningful units. Subjects and predicates are put together to make simple propositions, which then may be connected in specific ways to form more complex propositions whose truth-values can be determined from the truth-values of their constituents. Since Stoic syntactic theory is tied to the analysis of natural language, it describes not only the

structure of propositions, but also the relation of propositions

to other sorts of sentences such as questions and imperatives.

Particularly in this attempt to deal with uses of language other

than assertions of fact, but also more generally in their depiction

of syntax as a system for generating, and not merely classifying,

propositions, the Stoics trod upon territory which logicians

did not visit again until modern times.

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