Type-Logical Semantics

Bob Carpenter
(Lucent Technologies)

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series), 1997, xxi+575 pp; hardbound,
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This is a very ambitious book, which tries to do several different things: give a detailed
and self-contained introduction to type-logical semantics and categorial grammar; il-
lustrate this framework with a comprehensive set of illustrations of semantic analysis
of English; and relate all of this to current research within the categorial tradition. It
apparently derives from the author's "introductory" course on natural language se-
mantics, but the end result is very far from introductory (I suspect it would scare most
beginning linguistics students to death) and the book contains a great deal of original
and insightful analysis of interesting semantic phenomena.

The first chapter contains a potted introduction to the history of formal and linguis-
tic semantics and related aspects of the philosophy of language and logic; the second
consists of an extended introduction to the lambda calculus, combinators, types, etc,
and the third is a development of the particular higher-order logic used later. Of these
chapters, the first is relatively superficial, but the second and third are very detailed
and, more importantly, very clear. I would guess Carpenter is an excellent teacher:
he presents difficult material in an appealing way, and doesn't go overboard on terse
notation or Greek letters.

Chapter 4 introduces various flavors of categorial grammar, and Chapter 5 de-
scribes the Lambek calculus. By this time we are 180 pages or so into the book, and I
was beginning to realize that I didn't (even) know as much as I thought I did about
categorial grammar.

Semantic analysis of English starts off with coordination and unbounded depen-
dencies (Chapter 6). Carpenter provides his own analysis of these phenomena, incor-
porating various devices from the categorial literature. His reference to earlier work,
here and throughout the book, is always very good, with short summaries of ap-
proaches to particular issues by other scholars, showing how they differ, or can be
seen as different ways of doing the same thing.

Chapter 7 is a long discussion of quantifiers and scope problems. Carpenter starts
with Montague's "quantifying in" and Cooper's storage approach to scoping, and
then argues that the type-logical treatment he develops captures some of the good
features of these approaches, while avoiding most of their descriptive and theoretical
problems. He then goes on to a more general discussion of NP meanings, covering
definites and indefinites, generics, and possessives, followed by a somewhat tangential
but interesting approach to comparatives, and finally discussing existential sentences.

Chapter 8 provides an analysis of plural NPs, again giving some very useful
summaries of earlier approaches, and gradually developing a semantics that can cope

with most of the familiar phenomena: collective, distributive, group readings, etc. Chapter 9 discusses those (rather few) cases of pronouns that lend themselves to a categorial treatment: reflexives and reciprocals, essentially.

The final three chapters look at various types of intensionality. Chapter 10 introduces tense and modal logic, and possible-worlds semantics, and presents them within the type-theoretical framework developed earlier. Chapter 11 analyzes various types of control phenomena, opacity with intensional verbs; and Chapter 12 describes tense, aspect, and various types of temporal modification. A substantial appendix gives some introductory material on set theory, first-order logic, and Boolean algebras.

This is a huge book, full of interesting material. You could read it as a synthesis of many current approaches to linguistic description within a categorial framework, or as an introduction to semantic analysis using higher-order logic. You can also dip into it as a reference book to get a quick summary of recent work within this tradition on one of the many areas of linguistic description covered.

There is little that is overtly computational, but much that could be easily translated into several different computational frameworks. I doubt whether it would be useful as an introductory textbook for anyone other than very advanced students, unless it was the basis of a very long course of instruction, but for students and researchers who are capable of following the technical developments, it is a rewarding and lively read. (Anyone who completes all the exercises successfully will know an awful lot about logic and semantics.)

I enjoyed the book, despite being initially daunted by its length, and I learned, and am learning, a lot from it. Persuade your librarian to buy it, but be careful not to drop it on your toe.

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