LINGUISTICS AND THE FORMAL SCIENCES

The formal sciences, particularly mathematics, have had a profound influence on the development of linguistics. This insightful overview looks at techniques that were introduced in the fields of mathematics, logic, and philosophy during the twentieth century, and explores their effect on the work of various linguists. In particular, it discusses the foundations crisis that destabilised mathematics at the start of the twentieth century, the numerous related movements which sought to respond to this crisis, and how they influenced the development of syntactic theory in the 1950s. This book provides a ground-breaking and detailed reassessment of Chomsky’s early work, and concludes by discussing the resulting major consequences for current syntactic theory. Informative and revealing, this book will be invaluable to all those working in formal linguistics, in particular those interested in its history and development.

Marcus Tomalin is a Fellow of Downing College, University of Cambridge. His academic interests are wide-ranging and include syntactic theory, the history of linguistics, mathematical models of linguistic theory development, and the modelling of syntactic structure in large vocabulary speech recognition systems. He publishes regularly on these diverse topics in various international journals.
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LINGUISTICS AND THE FORMAL SCIENCES
THE ORIGINS OF GENERATIVE GRAMMAR

MARCUS TOMALIN
Downing College, Cambridge
since feeling is first
who pays any attention
to the syntax of things
will never wholly kiss you;

e. e. cummings
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While it is hoped that all solecisms, inexactitudes, and stupidities have been unremittingly excised from this text, the remaining errors exist to remind us of our imperfections.

This book is dedicated to Arbutus Cove, Victoria B.C., where, turning the corner, I glimpsed the sea.
Mathematical symbols

 ∀' indicates universal quantification: ‘∀x[φ(x)]’ means ‘for all x it is the case that φ(x) holds’.

∃' indicates existential quantification: ‘∃x[φ(x)]’ means ‘there exists an x for which φ(x) holds’.

¬' indicates negation: ‘¬φ(x)’ means ‘it is not the case that φ(x) holds’.

→' indicates implication: ‘p → q’ means ‘if p, then q’.

∧' indicates conjunction: ‘p ∧ q’ means ‘p and q’.

∨' indicates disjunction: ‘p ∨ q’ means ‘p or q’.

N’ indicates the set of natural numbers: N = {1, 2, 3, ...}.

‘∈’ indicates ‘is a member of’: ‘x ∈ A’ means ‘x is a member of set A’.

‘∉’ indicates ‘is not a member of’: ‘x ∉ A’ means ‘x is not a member of set A’.
Abbreviations

Books/Book-length Manuscripts/Theses

**LCW** Carnap, R. (1928), *Der logische Aufbau der Welt* [The Logical Construction of the World]

**LPV** Quine, W. V. O. (1953), *From a Logical Point of View*

**LSL** Carnap, R. (1937[1934]), *The Logical Syntax of Language*

**LSLT** Chomsky, N. (1975[1955]), *The Logical Structure of Linguistic Theory*

**MMH** Chomsky, N. (1979b[1951]), *Morphophonemics of Modern Hebrew*

**MP** Chomsky, N. (1995), *The Minimalist Program*

**MSL** Harris, Z. S. (1951), *Methods in Structural Linguistics*


**SA** Goodman, N. (1951), *The Structure of Appearance*

**SS** Chomsky, N. (1957), *Syntactic Structures*

Papers

‘LSS’ Chomsky, N. (1955a), ‘Logical Syntax and Semantics: Their Linguistic Relevance’

‘SCN’ Goodman, N. and Quine, W. V. O. (1947), ‘Steps Towards a Constructive Nominalism’

‘SSA’ Chomsky, N. (1953), ‘Systems of Syntactic Analysis’