

Logic 1 Lecture Notes Philosophy

In this 2005 book, logic, mathematical knowledge and objects are explored alongside reason and intuition in the exact sciences.

Defeasibility, most generally speaking, means that given some set of conditions A, something else B will hold, unless or until defeating conditions C apply. While the term was introduced into philosophy by legal philosopher H.L.A. Hart in 1949, today, the concept of defeasibility is employed in many different areas of philosophy. This volume for the first time brings together contributions on defeasibility from epistemology (Mikael Janvid, Klemens Kappel, Hannes Ole Matthiessen, Marcus Willaschek, Michael Williams), legal philosophy (Frederick Schauer) and ethics and the philosophy of action (Claudia Blöser, R. Jay Wallace, Michael Quante and Katarzyna Paprzycka). The volume ends with an extensive bibliography (by Michael de Araujo Kurth).

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This collection of papers from various areas of mathematical logic showcases the remarkable breadth and richness of the field. Leading authors reveal how contemporary technical results touch upon foundational questions about the nature of mathematics. Highlights of the volume include: a history of Tennenbaum's theorem in arithmetic; a number of papers on Tennenbaum phenomena in weak arithmetics as well as on other aspects of arithmetics, such as interpretability; the transcript of Gödel's previously unpublished 1972–1975 conversations with Sue Toledo, along with an appreciation of the same by Curtis Franks; Hugh Woodin's paper arguing against the generic multiverse view; Anne Troelstra's history of intuitionism through 1991; and Aki Kanamori's history of the Suslin problem in set theory. The book provides a historical and philosophical treatment of particular theorems in arithmetic and set theory, and is ideal for researchers and graduate students in mathematical logic and philosophy of mathematics.

Stanislaw Lesniewski (1886-1939) was one of the leading Polish logicians and founders of the Warsaw School of Logic whose membership included, beside himself, Jan Lukasiewicz, Tadeusz Kotarbinski, Alfred Tarski, and many others. In his lifetime Lesniewski published only a few hundred pages. He produced many important results in many areas of mathematics; these stood in various relations to each other, and to materials produced by others, and, in time, created more and more editorial problems. Very many were left unpublished at the time of his death. Then in 1944 in the fire of Warsaw the whole of this material was burned and lost -a considerable loss since a great deal of what is important could have been reconstructed from these notes. The present publication aims at presenting unique Lesniewski's materials from alternative sources comprising lecture notes taken during some of Lesniewski's lectures and seminars delivered at the University of Warsaw between the two world wars. The editors are aware of the limitations of student notes which cannot compensate for the loss of the original materials. However, they are unique in reflecting Lesniewski's ideas as he himself presented them. Already at the time of his death it was realized that these notes would provide a unique access to Lesniewski's own thought as well as a valuable record of some of the activities of the Warsaw School of Logic.

This book features mathematical and formal philosophers' efforts to understand philosophical questions using mathematical techniques. It offers a collection of works from leading researchers in the area, who discuss some of the most fascinating ways formal methods are now being applied. It covers topics such as: the uses of probable and statistical reasoning, rational choice theory, reasoning in the environmental sciences, reasoning about laws and changes of rules, and reasoning about collective decision procedures as well as about action. Utilizing mathematical techniques has been very fruitful in the traditional domains of formal philosophy – logic, philosophy of mathematics and metaphysics – while formal philosophy is

simultaneously branching out into other areas in philosophy and the social sciences. These areas particularly include ethics, political science, and the methodology of the natural and social sciences. Reasoning about legal rules, collective decision-making procedures, and rational choices are of interest to all those engaged in legal theory, political science and economics. Statistical reasoning is also of interest to political scientists and economists. Since their inception, the Perspectives in Logic and Lecture Notes in Logic series have published seminal works by leading logicians. Many of the original books in the series have been unavailable for years, but they are now in print once again. This volume, the sixteenth publication in the Lecture Notes in Logic series, gives a sustained presentation of a particular view of the topic of Gödelian extensions of theories. It presents the basic material in predicate logic, set theory and recursion theory, leading to a proof of Gödel's incompleteness theorems. The inexhaustibility of mathematics is treated based on the concept of transfinite progressions of theories as conceived by Turing and Feferman. All concepts and results are introduced as needed, making the presentation self-contained and thorough. Philosophers, mathematicians and others will find the book helpful in acquiring a basic grasp of the philosophical and logical results and issues.

This volume is the product of the Proceedings of the 9th International Congress of Logic, Methodology and Philosophy of Science and contains the text of most of the invited lectures. Divided into 15 sections, the book covers a wide range of different issues. The reader is given the opportunity to learn about the latest thinking in relevant areas other than those in which they themselves may normally specialise.

The nineteenth century saw a movement to make higher mathematics rigorous. This seemed to be on the brink of success when it was thrown into confusion by the discovery of the class paradoxes. That initiated a period of intense research into the foundations of mathematics, and with it the birth of mathematical logic and a new, sharper debate in the philosophy of mathematics. The Search for Certainty examines this foundational endeavour from the discovery of the paradoxes to the present. Focusing on Russell's logicist programme and Hilbert's finitist programme, Giaquinto investigates how successful they were and how successful they could be. These questions are set in the context of a clear, non-technical exposition and assessment of the most important discoveries in mathematical logic, above all Gödel's undecidability theorems. More than six decades after those discoveries, Giaquinto asks what our present perspective should be on the question of certainty in mathematics. Taking recent developments into account, he gives reasons for a surprisingly positive response. This volume offers a wide range of both reconstructions of Nikolai Vasiliev's original logical ideas and their implementations in the modern logic and philosophy. A collection of works put together through the international workshop "Nikolai Vasiliev's Logical Legacy and the Modern Logic," this book also covers foundations of logic in the light of Vasiliev's contradictory ontology. Chapters range from a look at the Heuristic and Conceptual Background of Vasiliev's Imaginary Logic to Generalized Vasiliev-style Propositions. It includes works which cover Imaginary and Non-Aristotelian Logics, Inconsistent Set Theory and the Expansion of Mathematical Thinking, Plivalent Logic, and the Impact of Vasiliev's Imaginary Logic on Epistemic Logic. The Russian logician, Vasiliev, was widely recognized as one of the forerunners of modern non-classical logic.

His "imaginary logic" developed in some of his work at the beginning of 20th century is often considered to be one of the first systems of paraconsistent and multi-valued logic. The novelty of his logical project has opened up prospects for modern logic as well as for non-classical science in general. This volume contains a selection of papers written by modern specialists in the field and deals with various aspects of Vasiliev's logical ideas. The logical legacy of Nikolai Vasiliev can serve as a promising source for developing an impressive range of philosophical interpretations, as it marries promising technical innovations with challenging philosophical insights.

This 2007 volume includes surveys, tutorials, and selected research papers on advances in logic.

The ten volumes of "Handbook of Pragmatics Highlights" focus on the most salient topics in the field of pragmatics, thus dividing its wide interdisciplinary spectrum in a transparent and manageable way. While the other volumes select specific cognitive, grammatical, social, cultural, variational, interactional, or discursive angles, this 10th volume focuses on the interface between pragmatics and philosophy and reviews the philosophical background from which pragmatics has taken inspiration and with which it is constantly confronted. It provides the reader with information about authors relevant to the development of pragmatics, trends or areas in philosophy that are relevant for the definition of the main concepts in pragmatics or the characterization of its cultural context, the neighbouring field of semantics (with particular respect to truth-conditional semantics and some main branches of formal semantics), and recent philosophical debates that involve pragmatic notions such as indexicality and context. While most of the references are to the analytic philosophical field, also perspectives in so-called continental philosophy are taken into account. The introductory chapter outlines some unifying routes of reflection as regards meaning, speech as action, and self and mind, and suggests some connections between doing pragmatics and doing philosophy.

This book is a collection of contributions honouring Arnon Avron's seminal work on the semantics and proof theory of non-classical logics. It includes presentations of advanced work by some of the most esteemed scholars working on semantic and proof-theoretical aspects of computer science logic. Topics in this book include frameworks for paraconsistent reasoning, foundations of relevance logics, analysis and characterizations of modal logics and fuzzy logics, hypersequent calculi and their properties, non-deterministic semantics, algebraic structures for many-valued logics, and representations of the mechanization of mathematics. Avron's foundational and pioneering contributions have been widely acknowledged and adopted by the scientific community. His research interests are very broad, spanning over proof theory, automated reasoning, non-classical logics, foundations of mathematics, and applications of logic in computer science and artificial intelligence. This is clearly reflected by the diversity of topics discussed in the chapters included in this book, all of which

directly relate to Avron's past and present works. This book is of interest to computer scientists and scholars of formal logic.

This volume presents a number of systems of logic which can be considered as alternatives to classical logic. The notion of what counts as an alternative is a somewhat problematic one. There are extreme views on the matter of what is the 'correct' logical system and whether one logical system (e. g. classical logic) can represent (or contain) all the others. The choice of the systems presented in this volume was guided by the following criteria for including a logic as an alternative: (i) the departure from classical logic in accepting or rejecting certain theorems of classical logic following intuitions arising from significant application areas and/or from human reasoning; (ii) the alternative logic is well-established and well-understood mathematically and is widely applied in other disciplines such as mathematics, physics, computer science, philosophy, psychology, or linguistics. A number of other alternatives had to be omitted for the present volume (e. g. recent attempts to formulate so-called 'non-monotonic' reasoning systems). Perhaps these can be included in future extensions of the Handbook of Philosophical Logic. Chapter 1 deals with partial logics, that is, systems where sentences do not always have to be either true or false, and where terms do not always have to denote. These systems are thus, in general, geared towards reasoning in partially specified models. Logics of this type have arisen mainly from philosophical and linguistic considerations; various applications in theoretical computer science have also been envisaged.

This volume presents different conceptions of logic and mathematics and discuss their philosophical foundations and consequences. This concerns first of all topics of Wittgenstein's ideas on logic and mathematics; questions about the structural complexity of propositions; the more recent debate about Neo-Logicism and Neo-Fregeanism; the comparison and translatability of different logics; the foundations of mathematics: intuitionism, mathematical realism, and formalism. The contributing authors are Matthias Baaz, Francesco Berto, Jean-Yves Beziau, Elena Dragalina-Chernya, Günther Eder, Susan Edwards-McKie, Oliver Feldmann, Juliet Floyd, Norbert Gratzl, Richard Heinrich, Janusz Kaczmarek, Wolfgang Kienzler, Timm Lampert, Itala Maria Loffredo D'Ottaviano, Paolo Mancosu, Matthieu Marion, Felix Mühlhölzer, Charles Parsons, Edi Pavlovic, Christoph Pfisterer, Michael Potter, Richard Raatzsch, Esther Ramharter, Stefan Rieglernik, Gabriel Sandu, Georg Schiemer, Gerhard Schurz, Dana Scott, Stewart Shapiro, Karl Sigmund, William W. Tait, Mark van Atten, Maria van der Schaar, Vladimir Vasyukov, Jan von Plato, Jan Wole?ski and Richard Zach.

Kurt Gödel (1906–1978) did groundbreaking work that transformed logic and other important aspects of our understanding of mathematics, especially his proof of the incompleteness of formalized arithmetic. This book on different aspects of his work and on subjects in which his ideas have contemporary resonance includes papers from a May 2006 symposium celebrating Gödel's centennial as well as papers from a 2004 symposium. Proof theory, set theory, philosophy of

mathematics, and the editing of Gödel's writings are among the topics covered. Several chapters discuss his intellectual development and his relation to predecessors and contemporaries such as Hilbert, Carnap, and Herbrand. Others consider his views on justification in set theory in light of more recent work and contemporary echoes of his incompleteness theorems and the concept of constructible sets.

A single volume reference guide to the latest work and potential future directions in Philosophical Logic, written by an international team of leading scholars.

"This is a significant and often rather demanding collection of essays. It is an anthology putting together the uncollected works of an important twentieth-century philosopher. Many of the articles treat one or another of the more important issues considered by analytic philosophers during the last quarter-century. Of significant importance to philosophers interested in researching the many topics contained in *Logic Matters* is the inclusion in this anthology of a rather extensive eight-page name-topic index."--Thomist "The papers are arranged by topic: Historical Essays, Traditional Logic, Theory of Reference and Syntax, Intentionality, Quotation and Semantics, Set Theory, Identity Theory, Assertion, Imperatives and Practical Reasoning, Logic in Metaphysics and Theology. The broad range of issues that have engaged Geach's complex and systematic reasoning is impressive. In addition to classical logic, topics in ethics, ontology, and even the logic of religious dogmas are tackled the work in this collection is more brilliant and ingenious than it is difficult and demanding."--Philosophy of Science "Geach displays his mastery of applying logical techniques and concepts to philosophical questions. Compared with most works in philosophical logic this book is remarkable for its range of topics. Plato, Aristotle, Aquinas, Russell, Wittgenstein, and Quine all figure prominently. Geach's style is remarkably lively considering the rightly argued matter. Although some of the articles treat rather technical questions in mathematical logic, most are accessible to philosophers with modest backgrounds in logic." --Choice

This volume contains papers on truth, logic, semantics, and history of logic and philosophy. These papers are dedicated to Jan Wolenski to honor his 60th birthday. Jan Wolenski is professor of philosophy at the Department of Philosophy of the Jagiellonian University in Cracow, Poland. He is likely to be the most well-known Polish philosopher of this time, best known for his work on the history of the philosophy and logic of the Lvov-Warsaw School. A useful reference work to both students and researchers in formal philosophy, language and logic. This second edition is intended to comprise some 18 volumes and provides in-depth coverage of major topics in philosophical logic and its applications in many cutting-edge fields relating to computer science, language, argumentation, and others.

This anthology of the very latest research on truth features the work of recognized luminaries in the field, put together following a rigorous refereeing process. Along with an introduction outlining the central issues in the field, it provides a unique and unrivaled view of contemporary work on the nature of truth, with papers selected from key conferences in 2011 such as *Truth Be Told* (Amsterdam), *Truth at Work* (Paris), *Paradoxes of Truth and Denotation* (Barcelona) and *Axiomatic Theories of Truth* (Oxford). Studying the nature of the concept of 'truth' has always been a core role of philosophy, but recent years have been a boom time in the topic. With a wealth of recent conferences examining the subject from various angles, this collection of essays recognizes the pressing need for a volume that brings scholars up to date on the arguments. Offering academics and graduate students alike a much-needed repository of today's cutting-edge work in this vital topic of philosophy, the volume is required reading for anyone needing to keep abreast of developments, and is certain to act as a catalyst for further innovation and research.

Proof Theory of Modal Logic is devoted to a thorough study of proof systems for modal logics,

that is, logics of necessity, possibility, knowledge, belief, time, computations etc. It contains many new technical results and presentations of novel proof procedures. The volume is of immense importance for the interdisciplinary fields of logic, knowledge representation, and automated deduction.

Logical methods are used in all area of philosophy. By introducing and advancing central to topics in the discipline, *The Bloomsbury Companion to Philosophical Logic* emphasizes the crucial role logic plays in understanding philosophical problems. Covering stages in the history of logic and of modern logic, this comprehensive Companion looks ahead to new areas of research and explores issues pertaining to classical logic and its rivals, semantics for parts of natural language, and the application of logic in the theory of rationality. Experts in the field provide a mix of technical chapters that offer excellent encyclopaedias of results in the area and chapters of philosophical discussions that survey a range of philosophical positions. To facilitate further study, this volumes also includes a series of research tools such as a detailed index, an up-to-date list of resources and an annotated bibliography. Balancing technical exposition with philosophical discussion, *The Bloomsbury Companion to Philosophical Logic* not only provides students and lecturers with the basis of a course in philosophical logic, it offers anyone working in this key area of contemporary philosophy a valuable research resource.

An introduction to the philosophy of mathematics grounded in mathematics and motivated by mathematical inquiry and practice. In this book, Joel David Hamkins offers an introduction to the philosophy of mathematics that is grounded in mathematics and motivated by mathematical inquiry and practice. He treats philosophical issues as they arise organically in mathematics, discussing such topics as platonism, realism, logicism, structuralism, formalism, infinity, and intuitionism in mathematical contexts. He organizes the book by mathematical themes--numbers, rigor, geometry, proof, computability, incompleteness, and set theory--that give rise again and again to philosophical considerations.

Often people have wondered why there is no introductory text on category theory aimed at philosophers working in related areas. The answer is simple: what makes categories interesting and significant is their specific use for specific purposes. These uses and purposes, however, vary over many areas, both "pure", e.g., mathematical, foundational and logical, and "applied", e.g., applied to physics, biology and the nature and structure of mathematical models. Borrowing from the title of Saunders Mac Lane's seminal work "Categories for the Working Mathematician", this book aims to bring the concepts of category theory to philosophers working in areas ranging from mathematics to proof theory to computer science to ontology, from to physics to biology to cognition, from mathematical modeling to the structure of scientific theories to the structure of the world. Moreover, it aims to do this in a way that is accessible to non-specialists. Each chapter is written by either a category-theorist or a philosopher working in one of the represented areas, and in a way that builds on the concepts that are already familiar to philosophers working in these areas.

The book presents the state of the art of research into the legacy of interwar Polish analytic philosophy and exemplifies different approaches to the history of philosophy. It contains discussions and reconstructions of aspects of Polish philosophy and logic as well as reactions to and developments of this tradition.

This volume contains thirty-nine revised and extended research articles, written by prominent researchers participating in the World Congress on Engineering and Computer Science 2014, held in San Francisco, October 22-24 2014. Topics covered include engineering mathematics, electrical engineering, circuit design, communications systems, computer science, chemical engineering, systems engineering and applications of engineering science in industry. This book describes some significant advances in engineering technologies and also serves as an excellent source of reference for researchers and graduate students.

Kant actively struggles with the problem of how to conceive of God's creative action in relation to human freedom. He comes to the view that human freedom can only be protected if God withdraws in certain ways from the created world. The two pillars of Kant's mature philosophy - transcendental idealism and freedom - are in part shaped and motivated by Kant's need to provide a solution to his theological problem. The medieval and early modern theological tradition conceives of divine action as unlike the action of any created being. When the creature acts, God directly causes this action, but without reducing the creature's freedom. Kant explicitly discusses and rejects this account of divine and human concursus. This rejection has significant and surprising ramifications for Kant's wider philosophy, explaining otherwise incomprehensible claims in his critical philosophy. Christopher J. Insole presents a definitive study in the history of ideas, engaging with a wide range of Kant's texts from 1749 until the early 1800s. Many of these texts have received little or no attention in Kant studies to date. Insole places Kant's thought in relation to numerous historical and traditional positions and illuminates these positions by a close engagement with recent debates in analytical philosophy and systematic theology. Kant is unrelentingly honest when grappling with the difficulty of relating divine and human freedom. This study, of Kant's theological struggle and legacy, goes to the heart of the problem in the modern reception of what the Christian tradition has affirmed about human freedom. As such, the book throws light on one of the defining fault-lines in modern theology and philosophy.

Logic and the Modalities in the Twentieth Century is an indispensable research tool for anyone interested in the development of logic, including researchers, graduate and senior undergraduate students in logic, history of logic, mathematics, history of mathematics, computer science and artificial intelligence, linguistics, cognitive science, argumentation theory, philosophy, and the history of ideas. This volume is number seven in the eleven volume Handbook of the History of Logic. It concentrates on the development of modal logic in the 20th century, one of the most important undertakings in logic's long history. Written by the leading researchers and scholars in the field, the volume explores the logics of necessity and possibility, knowledge and belief, obligation and permission, time, tense and change, relevance, and more. Both this volume and the Handbook as a whole are definitive reference tools for students and researchers in the history of logic, the history of philosophy, and any discipline, such as mathematics, computer science, artificial intelligence, for whom the historical background of his or her work is a salient consideration. · Detailed and comprehensive chapters covering the entire range of modal logic. · Contains the latest scholarly discoveries and interpretative insights that answer many questions in the field of logic.

LOGIC: Lecture Notes for Philosophy, Mathematics, and Computer Science
Springer Nature
An Introduction to Formal Logic
Cambridge University Press

Logic and Representation brings together a collection of essays, written over a period of ten years, that apply formal logic and the notion of explicit representation of knowledge to a variety of problems in artificial intelligence, natural language semantics and the philosophy of mind and language. Particular attention is paid to modelling and reasoning about knowledge and belief, including reasoning about one's own beliefs, and the semantics of sentences about knowledge and belief. Robert C. Moore begins by exploring the role of logic in artificial intelligence, considering logic as an analytical tool, as a basis for reasoning systems, and as a programming language. He then looks at various logical analyses of propositional attitudes, including possible-world models, syntactic models, and models based on Russellian propositions. Next Moore examines autoepistemic logic, a logic for modelling reasoning about one's own beliefs. Rounding out the volume is a section on the semantics of natural language, including a survey of problems in semantic representation; a detailed study of the relations among events, situations, and adverbs; and a presentation of a unification-based approach to

semantic interpretation. Robert C. Moore is principal scientist of the Artificial Intelligence Center of SRI International.

The Fourth Scandinavian Logic Symposium and the First Soviet-Finnish Logic Conference were held in Jyväskylä, Finland, June 29-July 6, 1976. The Conferences were organized by a committee which consisted of the editors of the present volume. The Conferences were supported financially by the Ministry of Education of Finland, by the Academy of Finland, and by the Division of Logic, Methodology, and Philosophy of Science of the International Union of History of Science. The Philosophical Society of Finland and the Jyväskylä Summer Festival gave valuable help in various practicalities. 35 papers by authors representing 10 countries were presented at the two meetings. Of those papers 24 appear here. THE EDITORS v TABLE OF CONTENTS PREFACE v PART 1/ PROOF THEORY GEORG KREISEL / Some Facts from the Theory of Proofs and Some Fictions from General Proof Theory 3 DAG PRAWITZ / Proofs and the Meaning and Completeness of the Logical Constants 25 v. A. SMIRNOV / Theory of Quantification and tff-calculi 41 LARS SVENONIUS/Two Kinds of Extensions of Primitive Recursive Arithmetic 49 DIRK VAN DALEN and R. STATMAN / Equality in the Presence of Apartness 95 PART II / INFINITARY LANGUAGES VEIKKO RANTALA / Game-Theoretical Semantics and Back-and-Forth 119 MAARET KARTTUNEN / Infinitary Languages N_ω~.

The Logic Manual is the ideal introduction to logic for beginning philosophy students. It offers a concise but complete introductory course, giving a firm grounding in the logic that is needed to study contemporary philosophy. Exercises, examples, and sample examination papers are provided on an accompanying website.

The papers presented in this volume examine topics of central interest in contemporary philosophy of logic. They include reflections on the nature of logic and its relevance for philosophy today, and explore in depth developments in informal logic and the relation of informal to symbolic logic, mathematical metatheory and the limiting metatheorems, modal logic, many-valued logic, relevance and paraconsistent logic, free logics, extensional v. intensional logics, the logic of fiction, epistemic logic, formal logical and semantic paradoxes, the concept of truth, the formal theory of entailment, objectual and substitutional interpretation of the quantifiers, infinity and domain constraints, the Löwenheim-Skolem theorem and Skolem paradox, vagueness, modal realism v. actualism, counterfactuals and the logic of causation, applications of logic and mathematics to the physical sciences, logically possible worlds and counterpart semantics, and the legacy of Hilbert's program and logicism. The handbook is meant to be both a compendium of new work in symbolic logic and an authoritative resource for students and researchers, a book to be consulted for specific information about recent developments in logic and to be read with pleasure for its technical acumen and philosophical insights. - Written by leading logicians and philosophers - Comprehensive authoritative coverage of all major areas of contemporary research in symbolic logic - Clear, in-depth expositions of technical detail - Progressive organization from general considerations to informal to symbolic logic to nonclassical logics - Presents current work in symbolic logic within a unified framework - Accessible to students, engaging for experts and professionals - Insightful philosophical discussions of all aspects of logic - Useful bibliographies in every chapter

The History of Philosophical and Formal Logic introduces ideas and thinkers central to the development of philosophical and formal logic. From its Aristotelian origins to the present-day arguments, logic is broken down into four main time periods: Antiquity and the Middle Ages (Aristotle and The Stoics) The early modern period (Bolzano, Boole) High modern period (Frege, Peano & Russell and Hilbert) Early 20th century (Godel and Tarski) Each new time frame begins with an introductory overview highlighting themes and points of importance. Chapters discuss the significance and reception of influential works and look at historical

arguments in the context of contemporary debates. To support independent study, comprehensive lists of primary and secondary reading are included at the end of chapters, along with exercises and discussion questions. By clearly presenting and explaining the changes to logic across the history of philosophy, *The History of Philosophical and Formal Logic* constructs an easy-to-follow narrative. This is an ideal starting point for students looking to understand the historical development of logic.

This volume constitutes the Proceedings of a workshop on formal semantics of natural languages which was held in Tiibingen from the 1st to the 3rd of December 1977. Its main body consists of revised versions of most of the papers presented on that occasion. Three supplementary papers (those by Gabbay and Smaby) are included because they seem to be of particular interest in their respective fields. The area covered by the work of scholars engaged in philosophical logic and the formal analysis of natural languages testifies to the liveliness in those disciplines. It would have been impossible to aim at a complete documentation of relevant research within the limits imposed by a short conference whereas concentration on a single topic would have conveyed the false impression of uniformity foreign to a young and active field. It is hoped that the essays collected in this volume strike a reasonable balance between the two extremes. The topics discussed here certainly belong to the most important ones enjoying the attention of linguists and philosophers alike: the analysis of tense in formal and natural languages (van Benthem, Gabbay), the quickly expanding domain of generalized quantifiers (Goldblatt), the problem of vagueness (Kamp), the connected areas of pronominal reference (Smaby) and presupposition (von Stechow) and, last but not least, modal logic as a sort of all-embracing theoretical framework (Bressan). The workshop which led to this collection formed part of the activities celebrating the 500th anniversary of Tiibingen University. This volume covers a wide range of topics that fall under the 'philosophy of quantifiers', a philosophy that spans across multiple areas such as logic, metaphysics, epistemology and even the history of philosophy. It discusses the import of quantifier variance in the model theory of mathematics. It advances an argument for the uniqueness of quantifier meaning in terms of Evert Beth's notion of implicit definition and clarifies the oldest explicit formulation of quantifier variance: the one proposed by Rudolf Carnap. The volume further examines what it means that a quantifier can have multiple meanings and addresses how existential vagueness can induce vagueness in our modal notions. Finally, the book explores the role played by quantifiers with respect to various kinds of semantic paradoxes, the logicity issue, ontological commitment, and the behavior of quantifiers in intensional contexts.

Are there such things as merely possible people, who would have lived if our ancestors had acted differently? Are there future people, who have not yet been conceived? Questions like those raise deep issues about both the nature of being and its logical relations with contingency and change. In *Modal Logic as Metaphysics*, Timothy Williamson argues for positive answers to those questions on the basis of an integrated approach to the issues, applying the technical resources of modal logic to provide structural cores for metaphysical theories. He rejects the search for a metaphysically neutral logic as futile, and proposes higher-order modal logic as a new setting in which to resolve such metaphysical questions scientifically, by the construction of systematic logical theories embodying rival answers and their comparison by normal scientific standards.

Ranging from Alan Turing's seminal 1936 paper to the latest work on Kolmogorov complexity and linear logic, this comprehensive new work clarifies the relationship between computability on the one hand and constructivity on the other. The authors argue that even though constructivists have largely shed Brouwer's solipsistic attitude to logic, there remain points of disagreement to this day. Focusing on the growing pains computability experienced as it was forced to address the demands of rapidly expanding applications, the content maps the developments following Turing's ground-breaking linkage of computation and the machine, the

resulting birth of complexity theory, the innovations of Kolmogorov complexity and resolving the dissonances between proof theoretical semantics and canonical proof feasibility. Finally, it explores one of the most fundamental questions concerning the interface between constructivity and computability: whether the theory of recursive functions is needed for a rigorous development of constructive mathematics. This volume contributes to the unity of science by overcoming disunities rather than offering an overarching framework. It posits that computability's adoption of a classical, ontological point of view kept these imperatives separated. In studying the relationship between the two, it is a vital step forward in overcoming the disagreements and misunderstandings which stand in the way of a unifying view of logic.

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