Paraconsistency: Logic and Applications

Paul A. Roth's book examines an important controversy in the philosophy of the social sciences that has developed since the demise of logical positivism and its conception of rationality. Roth contends that this controversy—a dispute over the canons of rationality—is the product of the mistaken belief in methodological exclusivism. Drawing on work in contemporary epistemology by W. V. O. Quine, Richard Rorty, and Paul Feyerabend, he argues that no single theory of human behavior has methodological priority; indeed, the existence of a plethora of theories for the study of human behavior, he believes, is an inevitable consequence of our epistemic situation.

Scientific Pluralism Reconsidered

Volume I brings together his very influential but scattered papers on the philosophy of the physical sciences, and includes one important unpublished essay on the effect of Newton's scientific achievement. Volume 2 presents his work on the philosophy of mathematics together with
some critical essays on contemporary philosophers of science.

**Between Logic and Reality**

Is reality logical and is logic real? What is the origin of logical intuitions? What is the role of logical structures in the operations of an intelligent mind and in communication? Is the function of logical structure regulative or constitutive or both in concept formation? This volume provides analyses of the logic-reality relationship from different approaches and perspectives. The point of convergence lies in the exploration of the connections between reality – social, natural or ideal – and logical structures employed in describing or discovering it. Moreover, the book connects logical theory with more concrete issues of rationality, normativity and understanding, thus pointing to a wide range of potential applications. The papers collected in this volume address cutting-edge topics in contemporary discussions amongst specialists. Some essays focus on the role of indispensability considerations in the justification of logical competence, and the wide range of challenges within the philosophy of mathematics. Others present advances in dynamic logical analysis such as extension of game semantics to non-logical part of vocabulary and development of models of contractive speech act.

**Judgement and the Epistemic Foundation of Logic**

This volume features essays about and by Paul Benacerraf, whose ideas have circulated in the philosophical community since the early nineteen sixties, shaping key areas in the philosophy of mathematics, the philosophy of language, the philosophy of logic, and epistemology. The book started as a workshop held in Paris at the Collège de France in May 2012 with the participation of Paul Benacerraf. The introduction addresses the methodological point of the legitimate use of so-called “Princess Margaret Premises” in drawing philosophical conclusions from Gödel’s first incompleteness theorem. The book is then divided into three sections. The first is devoted to an assessment of the improved version of the original dilemma of “Mathematical Truth” due to Hartry Field: the challenge to the platonist is now to explain the reliability of our mathematical beliefs given the very subject matter of mathematics, either pure or applied. The second addresses the issue of the ontological status of numbers: Frege’s logicism, fictionalism, structuralism, and Bourbaki’s theory of structures are called up for an appraisal of Benacerraf’s negative conclusions of “What Numbers Could Not Be.” The third is devoted to supertasks and bears witness to the unique standing of Benacerraf’s first publication: “Tasks, Super-Tasks, and Modern Eleatics” in debates on Zeno’s paradox and associated paradoxes, infinitary mathematics, and constructivism and finitism in the philosophy of mathematics. Two yet unpublished essays by Benacerraf have been included in the volume: an early version of “Mathematical Truth” from 1968 and an essay on “What Numbers Could Not Be” from the mid 1970’s. A complete chronological bibliography of Benacerraf’s work to 2016 is provided. Essays by Jody Azzouni, Paul
Benacerraf, Justin Clarke-Doane, Sébastien Gandon, Brice Halimi, Jon Pérez Laraudogoitia, Mary Leng, Antonio León-Sánchez and Ana C. León-Mejía, Marco Panza, Fabrice Pataut, Philippe de Rouilhan, Andrea Sereni, and Stewart Shapiro.

**The Problem of the Unity of the Sciences**

The demise of the logical positivism programme. The answers given to these questions have deepened the already existing gap between philosophy and the history and practice of science. While the positivists argued for a spontaneous, steady and continuous growth of scientific knowledge the post-positivists make a strong case for a fundamental discontinuity in the development of science which can only be explained by extrascientific factors. The political, social and cultural environment, the argument goes on, determine both the questions and the terms in which they should be answered. Accordingly, the sociological and historical interpretation involves in fact two kinds of discontinuity which are closely related: the discontinuity of science as such and the discontinuity of the more inclusive political and social context of its development. More precisely it explains the discontinuity of the former by the discontinuity of the latter subordinating in effect the history of science to the wider political and social history. The underlying idea is that each historical and social context generates scientific and philosophical questions of its own. From this point of view the question surrounding the nature of knowledge and its development are entirely new topics typical of the twentieth-century social context reflecting both the level and the scale of the development of science.

**The Unity of Perception**

From a Geometrical Point of View explores historical and philosophical aspects of category theory, trying therewith to expose its significance in the mathematical landscape. The main thesis is that Klein’s Erlangen program in geometry is in fact a particular instance of a general and broad phenomenon revealed by category theory. The volume starts with Eilenberg and Mac Lane’s work in the early 1940’s and follows the major developments of the theory from this perspective. Particular attention is paid to the philosophical elements involved in this development. The book ends with a presentation of categorical logic, some of its results and its significance in the foundations of mathematics. From a Geometrical Point of View aims to provide its readers with a conceptual perspective on category theory and categorical logic, in order to gain insight into their role and nature in contemporary mathematics. It should be of interest to mathematicians, logicians, philosophers of mathematics and science in general, historians of contemporary mathematics, physicists and computer scientists.

**Epistemology, Knowledge and the Impact of Interaction**
Belief revision theory and philosophy of science both aspire to shed light on the dynamics of knowledge—on how our view of the world changes (typically) in the light of new evidence. Yet these two areas of research have long seemed strangely detached from each other, as witnessed by the small number of cross-references and researchers working in both domains. One may speculate as to what has brought about this surprising, and perhaps unfortunate, state of affairs. One factor may be that while belief revision theory has traditionally been pursued in a bottom-up manner, focusing on the endeavors of single inquirers, philosophers of science, inspired by logical empiricism, have tended to be more interested in science as a multi-agent or agent-independent phenomenon.

The Age of Alternative Logics

This book develops a philosophical and logical interpretation of the concept of information within the formal structure of Constructive Type Theory (CTT), in a manner concurrent with a diverse range of contemporary perspectives on the philosophy of information. It presents a newly formulated and conceptually developed presentation of the Problem of Analyticity, and a new interesting perspective on the constructive interpretation of knowledge processes.

Otto Neurath and the Unity of Science

The first volume in this new series explores, through extensive co-operation, new ways of achieving the integration of science in all its diversity. The book offers essays from important and influential philosophers in contemporary philosophy, discussing a range of topics from philosophy of science to epistemology, philosophy of logic and game theoretical approaches. It will be of interest to philosophers, computer scientists and all others interested in the scientific rationality.

Meaning and Method in the Social Sciences

Jan Wolenski and Sandra Lapointe Polish philosophy goes back to the 13th century, when Witelo, famous for his works in optics and the metaphysics of light, lived and worked in Silesia. Yet, Poland’s academic life only really began after the University of Cracow was founded in 1364—its development was interrupted by the sudden death of King Kazimierz III, but it was re-established in 1400. The main currents of classical scholastic thought like Thomism, Scotism or Ockhamism had been late—about a century—to come to Poland and they had a considerable impact on the budding Polish philosophical scene. The controversy between the via antiqua and the via moderna was hotly debated. Intellectuals deliberated on the issues of conciliarism (whether the C- mon Council has priority over the Pope) and curialism (whether
the Bishop of Rome has priority over the Common Council). On the whole, the situation had at least two remarkable features. Firstly, Polish philosophy was pluralistic, and remained so, since its very beginning. But it was also eclectic, which might explain why it aimed to a large extent at achieving a compromise between rival views. Secondly, given the shortcomings of the political system of the time as well as external pressure by an increasingly hegemonic Germany, thinkers were very much interested in political matters. Poland was a stronghold of political thought (mostly inclined towards conciliarism) and Polish political thought distinguished itself in Europe.

**Games: Unifying Logic, Language, and Philosophy**

Reale's monumental work establishes the exact dimensions of Aristotle's concept of first philosophy and proves the profound unity of concept that exists in Aristotle's Metaphysics. Reale's opposition to the genetic interpretation of the Metaphysics is an updated return to a more traditional view of Aristotle's work, one which runs counter to nearly all contemporary scholarship. Reale argues that Aristotle's first philosophy includes a study of being, a study of substance, a study of divine substance, and a study of principles and causes, all of which are integrated and dialectically reconciled.

**Epistemic Logic**

This is the first volume in a series aimed at considering the scientific enterprise in light of recent developments in logic and philosophy. This work explores new ways of achieving the integration of science in all its diversity.

**Philosophy of Science**

Intuitionistic type theory can be described, somewhat boldly, as a partial fulfillment of the dream of a universal language for science. This book expounds several aspects of intuitionistic type theory, such as the notion of set, reference vs. computation, assumption, and substitution. Moreover, the book includes philosophically relevant sections on the principle of compositionality, lingua characteristica, epistemology, propositional logic, intuitionism, and the law of excluded middle. Ample historical references are given throughout the book.

**The Logic of Scientific Discovery**
Unifying the Philosophy of Truth

Science is a dynamic process in which the assimilation of new phenomena, perspectives, and hypotheses into the scientific corpus takes place slowly. The apparent disunity of the sciences is the unavoidable consequence of this gradual integration process. Some thinkers label this dynamical circumstance a ‘crisis’. However, a retrospective view of the practical results of the scientific enterprise and of science itself, grants us a clear view of the unity of the human knowledge seeking enterprise. This book provides many arguments, case studies and examples in favor of the unity of science. These contributions touch upon various scientific perspectives and disciplines such as: Physics, Computer Science, Biology, Neuroscience, Cognitive Psychology, and Economics.

Belief Revision meets Philosophy of Science

This compelling reevaluation of the relationship between logic and knowledge affirms the key role that the notion of judgement must play in such a review. The commentary repatriates the concept of judgement in the discussion, banished in recent times by the logical positivism of Wittgenstein, Hilbert and Schlick, and the Platonism of Bolzano. The volume commences with the insights of Swedish philosopher Per Martin-Löf, the father of constructive type theory, for whom logic is a demonstrative science in which judgement is a settled feature of the landscape. His paper opens the first of four sections that examine, in turn, historical philosophical assessments of judgement and reason; their place in early modern philosophy; the notion of judgement and logical theory in Wolff, Kant and Neo-Kantians like Windelband; their development in the Husserlian phenomenological paradigm; and the work of Bolzano, Russell and Frege. The papers, whose authors include Per Martin-Löf, Göran Sundholm, Michael Della Rocca and Robin Rollinger, represent a finely judged editorial selection highlighting work on philosophers exercised by the question of whether or not an epistemic notion of judgement has a role to play in logic. The volume will be of profound interest to students and academicians for its application of historical developments in philosophy to the solution of vexatious contemporary issues in the foundation of logic.

Vagueness: A Guide

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.

Logic, Epistemology, and the Unity of Science

This volume explores how vagueness matters as a specific problem in the context of theories that are primarily about something else. After an introductory chapter on the Sorites paradox, which exposes the various forms the paradox can take and some of the responses that have been pursued, the book proceeds with a chapter on vagueness and metaphysics, which covers important questions concerning vagueness that arise in connection with the deployment of certain key metaphysical notions. Subsequent chapters address the following: vagueness and logic, which discusses the sort of model theory that is suggested by the main, rival accounts of vagueness; vagueness and meaning, which focuses on contextualist, epistemicist, and indeterminist theories; vagueness and observationality; vagueness within linguistics, which focuses on approaches that take comparison classes into account; and the idea that vagueness in law is typically extravagant and that extravagant vagueness is a necessary feature of legal systems.

Semantics and Truth

This book is the first in the field of paraconsistency to offer a comprehensive overview of the subject, including connections to other logics and applications in information processing, linguistics, reasoning and argumentation, and philosophy of science. It is recommended reading for anyone interested in the question of reasoning and argumentation in the presence of contradictions, in semantics, in the paradoxes of set theory and in the puzzling properties of negation in logic programming. Paraconsistent logic comprises a major logical theory and offers the broadest possible perspective on the debate of negation in logic and philosophy. It is a powerful tool for reasoning under contradictoriness as it investigates logic systems in which contradictory information does not lead to arbitrary conclusions. Reasoning under contradictions constitutes one of most important and creative achievements in contemporary logic, with deep roots in philosophical questions involving negation and consistency. This book offers an invaluable introduction to a topic of central importance in logic and philosophy. It discusses (i) the history of paraconsistent logic; (ii) language, negation, contradiction, consistency and inconsistency; (iii) logics of formal inconsistency (LFIs) and the main paraconsistent propositional systems; (iv) many-valued companions, possible-translations semantics and non-deterministic semantics; (v) paraconsistent modal
logics; (vi) first-order paraconsistent logics; (vii) applications to information processing, databases and quantum computation; and (viii) applications to deontic paradoxes, connections to Eastern thought and to dialogical reasoning.

**Logic, Epistemology, and the Unity of Science**

In the last century, developments in mathematics, philosophy, physics, computer science, economics and linguistics have proven important for the development of logic. There has been an influx of new ideas, concerns, and logical systems reflecting a great variety of reasoning tasks in the sciences. This book embodies the multi-dimensional interplay between logic and science, presenting contributions from the world's leading scholars on new trends and possible developments for research.

**Paraconsistent Logic: Consistency, Contradiction and Negation**

Part of a trilogy exploring the theory of knowledge by one of the world's foremost philosophers.

**The Concept of First Philosophy and the Unity of the Metaphysics of Aristotle**

This second volume in the series Logic, Epistemology, and the Unity of Science brings a pragmatic perspective to the discussion of the unity of science. Contemporary philosophy and cognitive science increasingly acknowledge the systematic interrelation of language, thought and action. The principal function of language is to enable speakers to communicate their intentions to others, to respond flexibly in a social context and to act cooperatively in the world. This book will contribute to our understanding of this dynamic process by clearly presenting and discussing the most important hypotheses, issues and theories in philosophical and logical study of language, thought and action. Among the fundamental issues discussed are the rationality and freedom of agents, theoretical and practical reasoning, individual and collective attitudes and actions, the nature of cooperation and communication, the construction and conditions of adequacy of scientific theories, propositional contents and their truth conditions, illocutionary force, time, aspect and presupposition in meaning, speech acts within dialogue, the dialogical approach to logic and the structure of dialogues and other language games, as well as formal methods needed in logic or artificial intelligence to account for choice, paradoxes, uncertainty and imprecision. This volume contains major contributions by leading logicians, analytic philosophers, linguists and computer scientists. It will be of interest to graduate students and researchers from philosophy, logic, linguistics, cognitive science and artificial intelligence. There is no comparable survey in the existing literature.
The Unity of Science in the Arabic Tradition

Can we expect our scientific theories to make up a unified structure, or do they form a kind of “patchwork” whose pieces remain independent from each other? Does the proliferation of sometimes incompatible representations of the same phenomenon compromise the ability of science to deliver reliable knowledge? Is there a single correct way to classify things that science should try to discover, or is taxonomic pluralism here to stay? These questions are at the heart of philosophical debate on the unity or plurality of science, one of the most central issues in philosophy of science today. This book offers a critical overview and a new structure of this debate. It focuses on the methodological, epistemic, and metaphysical commitments of various philosophical attitudes surrounding monism and pluralism, and offers novel perspectives and pluralist theses on scientific methods and objects, reductionism, plurality of representations, natural kinds, and scientific classifications.

Mathematics, Logic, and their Philosophies

With this volume of the series Logic, Epistemology, and the Unity of Science edited by S. Rahman et al. a challenging dialogue is being continued. The series’ first volume argued that one way to recover the connections between logic, philosophy of sciences, and sciences is to acknowledge the host of alternative logics which are currently being developed. The present volume focuses on four key themes. First of all, several chapters unpack the connection between knowledge and epistemology with particular focus on the notion of knowledge as resulting from interaction. Secondly, new epistemological perspectives on linguistics, the foundations of mathematics and logic, physics, biology and law are a subject of analysis. Thirdly, several chapters are dedicated to a discussion of Constructive Type Theory and more generally of the proof-theoretical notion of meaning. Finally, the book brings together studies on the epistemic role of abduction and argumentation theory, both linked to non-monotonic approaches to the dynamics of knowledge.

Unity and Plurality

The author has taken an important subject, one which has pervaded the thinking of scientists, philosophers, and historians, and with impeccable scholarship and great clarity has concerned himself with a specific aspect of it: the way in which the determination of how the unity of the sciences is to be conceived presented itself to philosophers as a specifically philosophical or logical problem. The study is not, therefore, an essay in the history of ideas showing the idea of unity at work in many cultural contexts, or in the history of the classification of the sciences; nor does it discuss philosophers who suppose a unity but do not discuss it. Rather it is an exposition of what is directly said on the subject of unity by a number of philosophers who view it in their different ways as a problem for solving. Those chosen for discussion belong to the classical period of
modern philosophy, the seventeenth and eighteenth centuries, and chapters take up the contributions of Bacon, Descartes, Leibniz, Condillac, Diderot and D’Alembert, and Kant. This will be an important book for students and teachers in the history of philosophy, of science, of ideas, and will also be useful to students of English and French literature in the period it covers.

**Mathematics, Science and Epistemology: Volume 2, Philosophical Papers**

Described by the philosopher A.J. Ayer as a work of ‘great originality and power’, this book revolutionized contemporary thinking on science and knowledge. Ideas such as the now legendary doctrine of ‘falsificationism’ electrified the scientific community, influencing even working scientists, as well as post-war philosophy. This astonishing work ranks alongside *The Open Society and Its Enemies* as one of Popper’s most enduring books and contains insights and arguments that demand to be read to this day.

**From a Geometrical Point of View**

Philosophy of Science: A Unified Approach combines a general introduction to philosophy of science with an integrated survey of all its important subfields. As the book’s subtitle suggests, this excellent overview is guided methodologically by “a unified approach” to philosophy of science: behind the diversity of scientific fields one can recognize a methodological unity of the sciences. This unity is worked out in this book, revealing all the while important differences between subject areas. Structurally, this comprehensive book offers a two-part approach, which makes it an excellent introduction for students new to the field and a useful resource for more advanced students. Each chapter is divided into two sections. The first section assumes no foreknowledge of the subject introduced, and the second section builds upon the first by bringing into the conversation more advanced, complementary topics. Definitions, key propositions, examples and figures overview all of the core material. At the end of every chapter there are selected readings and exercises (with solutions at the end of the book). The book also includes a comprehensive bibliography and an index.

**Constructive Semantics**

Perception is our key to the world. It plays at least three different roles in our lives. It justifies beliefs and provides us with knowledge of our environment. It brings about conscious mental states. It converts informational input, such as light and sound waves, into representations of invariant features in our environment. Corresponding to these three roles, there are at least three fundamental questions that have motivated the study of perception. How does perception justify beliefs and yield knowledge of our environment? How does perception bring about conscious
mental states? How does a perceptual system accomplish the feat of converting varying informational input into mental representations of invariant features in our environment? This book presents a unified account of the phenomenological and epistemological role of perception that is informed by empirical research. So it develops an account of perception that provides an answer to the first two questions, while being sensitive to scientific accounts that address the third question. The key idea is that perception is constituted by employing perceptual capacities - for example the capacity to discriminate instances of red from instances of blue. Perceptual content, consciousness, and evidence are each analyzed in terms of this basic property of perception. Employing perceptual capacities constitutes phenomenal character as well as perceptual content. The primacy of employing perceptual capacities in perception over their derivative employment in hallucination and illusion grounds the epistemic force of perceptual experience. In this way, the book provides a unified account of perceptual content, consciousness, and evidence.

**Information and Knowledge**

Unity and Plurality presents novel ways of thinking about plurality while casting new light on the interconnections among the logical, philosophical, and linguistic aspects of plurals. The volume brings together new work on the logic and ontology of plurality and on the semantics of plurals in natural language. Plural reference, the view that definite plurals such as 'the students' refer to several entities at once (the individual students), is an approach favoured by logicians and philosophers, who take sentences with plurals ('the students gathered') not to be committed to entities beyond individuals, entities such as classes, sums, or sets. By contrast, linguistic semantics has been dominated by a singularist approach to plurals, taking the semantic value of a definite plural such as 'the students' to be a mereological sum or set. Moreover, semantics has been dominated by a particular ontological view of plurality, that of extensional mereology. This volume aims to build a bridge between the two traditions and to show the fruitfulness of nonstandard mereological approaches. A team of leading experts investigates new perspectives that arise from plural logic and non-standard mereology and explore novel applications to natural language phenomena.

**The Logic of Unity**

This edited book brings together research work in the field of constructive semantics with scholarship on the phenomenological foundations of logic and mathematics. It addresses one of the central issues in the epistemology and philosophy of mathematics, namely the relationship between phenomenological meaning constitution and constructive semantics. Contributing authors explore deep structural connections and fundamental differences between phenomenology and constructivism. Papers are drawn from contributions to a prestigious workshop held at the University of Friedrichshafen. Readers will discover insight into structural connections between the phenomenological concept of meaning constitution and constructivist concepts of meaning. Discussion ranges from more specific conceptualizations in the philosophy of logic and mathematics to more
general considerations in epistemology, inferential semantics and phenomenology. Questions such as a possible phenomenological understanding of the relationship between structural rules and particle rules in dialogical logic are explored. Significant aspects of both phenomenology and dialectics, and dialectics and constructivism emerge. Graduates and researchers of philosophy, especially logic, as well as scholars of mathematics will all find something of interest in the expert insights presented in this volume.

Truth, Objects, Infinity

Written for any readers interested in better harnessing philosophy’s real value, this book covers a broad range of fundamental philosophical problems and certain intellectual techniques for addressing those problems. In Introducing Philosophy: God, Mind, World, and Logic, Neil Tennant helps any student in pursuit of a ‘big picture’ to think independently, question received dogma, and analyse problems incisively. It also connects philosophy to other areas of study at the university, enabling all students to employ the concepts and techniques of this millennia-old discipline throughout their college careers — and beyond. KEY FEATURES AND BENEFITS: -- Investigates the philosophy of various subjects (psychology, language, biology, math), helping students contextualize philosophy and view it as an interdisciplinary pursuit; also helps students with majors outside of philosophy to see the relationship between philosophy and their own focused academic pursuits -- Author comes from a distinguished background in Logic and Philosophy of Language, which gives the book a level of rigor, balance, and analytic focus sometimes missing from primers to philosophy -- Introduces students to various important philosophical distinctions (e.g. fact vs. value, descriptive vs. prescriptive, norms vs. laws of nature, analytic vs. synthetic, inductive vs. deductive, a priori vs. a posteriori) providing skills that are important for undergraduates to develop in order to inform their study at higher levels. They are essential for further work in philosophy but they are also very beneficial for students pursuing most other disciplines -- Is much more methodologically comprehensive than competing introductions, giving the student the ability to address a wide range of philosophical problems — and not just the ones reviewed in the book -- Offers a companion website with links to apt primary sources, organized chapter-by-chapter, making unnecessary a separate Reader/Athology of primary sources — thus providing students with all reading material necessary for the course -- Provides five to ten discussion questions for each chapter, helping instructors and students better interact with the ideas and concepts in the text.

The Nature of Truth

This volume critically reexamines Otto Neurath’s conception of the unity of science. Some of the leading scholars of Neurath’s work, along with many prominent philosophers of science critically examine his place in the history of philosophy of science and evaluate the relevance of his work for contemporary debates concerning the unity of science.
Logic, Epistemology, and the Unity of Science

The book offers a characterization of the meaning and role of the notion of truth in natural languages and an explanation of why, in spite of the big amount of proposals about truth, this task has proved to be resistant to the different analyses. The general thesis of the book is that defining truth is perfectly possible and that the average educated philosopher of language has the tools to do it. The book offers an updated treatment of the meaning of truth ascriptions from taking into account the latest views in philosophy of language and linguistics.

Special Sciences and the Unity of Science

In the last two decades modal logic has undergone an explosive growth, to the point that a complete bibliography of this branch of logic, supposing that someone were capable to compile it, would itself a ponderous volume. What is impressive in the growth of modal logic has not been so much the quick accumulation of results but the richness of its thematic developments. In the 1960s, when Kripke semantics gave new credibility to the logic of modalities, which was already known and appreciated in the Ancient and Medieval times, no one could have foreseen that in a short time modal logic would become a lively source of ideas and methods for analytical philosophers, historians of philosophy, linguists, epistemologists and computer scientists. The aim which oriented the composition of this book was not to write a new manual of modal logic (there are a lot of excellent textbooks on the market, and the expert reader will realize how much we benefited from many of them) but to offer every reader, even with no specific background in logic, a conceptually linear path in the labyrinth of the current panorama of modal logic. The notion which in our opinion looked suitable to work as a compass in this enterprise was the notion of multimodality, or, more specifically, the basic idea of grounding systems on languages admitting more than one primitive modal operator.

Logic, Thought and Action

A logic is called ‘paraconsistent’ if it rejects the rule called ‘ex contradictione quodlibet’, according to which any conclusion follows from inconsistent premises. While logicians have proposed many technically developed paraconsistent logical systems and contemporary philosophers like Graham Priest have advanced the view that some contradictions can be true, and advocated a paraconsistent logic to deal with them, until recent times these systems have been little understood by philosophers. This book presents a comprehensive overview on paraconsistent logical systems to change this situation. The book includes almost every major author currently working in the field. The papers are on the cutting edge of the literature some of which discuss current debates and others present important new ideas. The editors have avoided papers about technical details of paraconsistent logic, but instead concentrated upon works that discuss more “big picture” ideas. Different treatments of paradoxes takes
centre stage in many of the papers, but also there are several papers on how to interpret paraconsistent logic and some on how it can be applied to philosophy of mathematics, the philosophy of language, and metaphysics.

**The Golden Age of Polish Philosophy**

The first volume in this new series explores, through extensive co-operation, new ways of achieving the integration of science in all its diversity. The book offers essays from important and influential philosophers in contemporary philosophy, discussing a range of topics from philosophy of science to epistemology, philosophy of logic and game theoretical approaches. It will be of interest to philosophers, computer scientists and all others interested in the scientific rationality.

**Treatise on Intuitionistic Type Theory**

This clear and elegant translation reveals how a modern Japanese thinker dared to show the basic flaw of Western epistemology. In unmasking this limitation, Matsuo presents an Eastern view of a unified experience, and provides an epistemological basis for comparative philosophy. Matsuo notes that while early Greek thought began by focusing on the right counsel ("Know thyself"), since then Western thought has been influenced by empiricistic analysis fired by the rise of scientific philosophy. The author thus turns to Eastern epistemology, in particular Buddhist thought, for clues to the unified experience. The seminal idea of emptiness (saunyata) plays a distinct role in this discovery. The concept of emptiness encompasses the whole dimension of perception where there is no room for separation into mind and body and/or any other form of dichotomy. Once it is known that the total dimension of perception—the logic of unity—functions in each and every person, then and only then can the field of comparative thought and philosophy be cleared of all preconceptions and move into a more fruitful exchange of ideas. Until such a time, Matsuo claims, we are hopelessly engaged in merely refining the epistemological process without ever being able to understand the very basis of intelligence.

**Modalities and Multimodalities**

Written by experts in the field, this volume presents a comprehensive investigation into the relationship between argumentation theory and the philosophy of mathematical practice. Argumentation theory studies reasoning and argument, and especially those aspects not addressed, or not addressed well, by formal deduction. The philosophy of mathematical practice diverges from mainstream philosophy of mathematics in the emphasis it places on what the majority of working mathematicians actually do, rather than on mathematical foundations. The book begins by...
first challenging the assumption that there is no role for informal logic in mathematics. Next, it details the usefulness of argumentation theory in the understanding of mathematical practice, offering an impressively diverse set of examples, covering the history of mathematics, mathematics education and, perhaps surprisingly, formal proof verification. From there, the book demonstrates that mathematics also offers a valuable testbed for argumentation theory. Coverage concludes by defending attention to mathematical argumentation as the basis for new perspectives on the philosophy of mathematics.

Introducing Philosophy

The book provides a historical (with an outline of the history of the concept of truth from antiquity to our time) and systematic exposition of the semantic theory of truth formulated by Alfred Tarski in the 1930s. This theory became famous very soon and inspired logicians and philosophers. It has two different, but interconnected aspects: formal-logical and philosophical. The book deals with both, but it is intended mostly as a philosophical monograph. It explains Tarski’s motivation and presents discussions about his ideas (pro and contra) as well as points out various applications of the semantic theory of truth to philosophical problems (truth-criteria, realism and anti-realism, future contingents or the concept of correspondence between language and reality).

The Argument of Mathematics

Ondrej Majer, Ahti-Veikko Pietarinen, and Tero Tulenheimo 1 Games and logic in philosophy Recent years have witnessed a growing interest in the unifying methodologies over what have been perceived as pretty disparate logical ‘systems’, or else merely an assortment of formal and mathematical ‘approaches’ to philosophical inquiry. This development has largely been fueled by an increasing dissatisfaction to what has earlier been taken to be a straightforward outcome of ‘logical pluralism’ or ‘methodological diversity’. These phrases appear to reflect the everyday chaos of our academic pursuits rather than any genuine attempt to clarify the general principles underlying the miscellaneous ways in which logic appears to us. But the situation is changing. Unity among plurality is emerging in contemporary studies in logical philosophy and neighbouring disciplines. This is a necessary follow-up to the intensive research into the intricacies of logical systems and methodologies performed over the recent years. The present book suggests one such peculiar but very unrestrained methodological perspective over the eld of logic and its applications in mathematics, language or computation: games. An allegory for opposition, cooperation and coordination, games are also concrete objects of formal study.