This is a review text file submitted electronically to MR.

Reviewer: Pérez-Ilzarbe, Paloma

Reviewer number: 29305

Address:

Departamento de Filosofía
Universidad de Navarra
E-31080 Pamplona
SPAIN
pilzarbe@unav.es

Author: Burgess, John P.

Short title: Philosophical logic.

MR Number: 2799362

Primary classification:

Secondary classification(s):

Review text:

The book is a short introduction to five non-classical logics (temporal, modal, conditional, relevantistic, and intuitionistic). In its 153 pages it has room for several items that students and non-specialists will thank: the philosophical motivations of the technical developments are treated; some useful suggestions for further readings are given (in particular, the reader is provided with sources of "second opinions"); and a number of technical proofs of the main results are given or at least sketched, leaving nonetheless to the reader the option of skipping them. Understandably, the book has not room for any compilation of "end-of-chapter problem sets" (sometimes offered as a complement to logic textbooks); it also has to neglect a systematic history of the different non-classical developments; and, finally, as a general rule, the technical results have preeminence over the discussion of the philosophical issues that underlie or are raised by them.

Although the author wants to separate the study of philosophical logic (concerned, just like classical logic, with valid forms of argument) from the philosophy of logic (concerned, it appears, with some presuppositions that are not relevant to the development of logic: see pages 2-3), the book can nevertheless be considered to contain some philosophy of logic in a wider sense, since the author not only offers a description of the different non-classical logics and a compilation of the main technical results, but he also (and "unashamedly": see page viii) addresses a number of substantive philosophical questions concerning them.

After a first chapter containing a survey of Classical Logic (pp. 1-12), Chapter

Two is devoted to Temporal Logic (pp. 13-39). First, the author substantiates the choice for what he calls the "autonomous approach to temporal logic", in contrast with the possibility of treating temporal distinctions by means of classical predicate logic. Then, the temporal non-truth-functional operators are introduced, the axioms and primitive rules for the minimal temporal logic are presented, some further non-primitive rules are proved, and some examples of theorems are provided and proved. Next, an extension of the minimal system is proposed, as a step "towards the temporal logic of classical physics". A brief section on the reduction of tenses follows, and a longer section on quantified temporal logic closes the chapter, with an assessment of the unsatisfactory situation concerning this particular development.

Chapter Three focuses on Modal Logic (pp. 40-70). As a preface, the author first offers some explanations concerning the use of Kripke models and the intuitive content of the accessibility relation, and then a taxonomy of modality is presented, mainly aimed at warning the reader against the "doubtless" notion of metaphysical necessity. Next, the minimal modal logic K and the series of the main increasingly strong systems are presented, with a brief proof of soundness. Next, after a short section on the reduction of modalities, two long sections are devoted to the proofs of completeness and decidability. Three pages are devoted to the philosophical question about "the correct" modal system. Again, a brief section on quantification closes the chapter, with only a concise mention to Quine's critique and a negative verdict on the current state of modal predicate logic.

Chapter Four deals with Conditional Logic (pp. 71-98), and concentrates mainly on indicative conditionals. After an outline of the Gricean attempt to save the classical account from objections, the non-classical theories are presented both in the traditional probabilistic form and in a novel model-theoretic form. The translation of the probabilistic language into "qualitative" terms is made by means of the notion of "degree of belief", which is given sense by the further notion of "remoteness from credibility", which in its turn is technically treated by means of the model-theoretic apparatus. Both the notions of probabilistic validity and model-theoretic validity are defined, and counterexamples are given to some classically valid rules of inference. Conditional deductions are defined and exemplified, and the deduction procedure is proved to be sound and complete. Almost four pages are devoted to the philosophical question about "the correct" logic of indicative conditionals, with a defense of the material conditional analysis in terms of conventional implicatures and shifting of standards. Two brief sections close the chapter, on counterfactual and weak conditionals.

Chapter Five is devoted to Relevantistic Logic (pp. 99-120). Burgess coins

the label "relevantistic" as a generic name covering three alternative ways of rejecting "the Lewis deduction", by rejecting either disjunction introduction, or disjunctive syllogism, or transitivity of entailment. Topic logic is briefly considered, but the proposal of preserving classical logic by appeal to topic-relatedness is dismissed as insufficient. Then a "perfectibility" criterion of entailment is examined, and the failure of transitivity in this account is assessed. The standard relevantistic accounts of entailment are examined, with a distinction between a "first degree" and a "purely implicational" fragment: that is, the relevantistic account of truth-functional connectives is separated from the relevantistic account of "implication". The longest section is devoted to the analysis of the "purely implicational" fragment of relevantistic logic, which interprets "implication" as a non-noninterference conditional, such as "if A, then B for that reason". Since the author repeatedly emphasizes the indispensability in mathematical practice of the three classical rules at issue, he explores two options available for the relevantistic. First, some moderate proposals of application of relevantistic logics to extra-mathematical domains are presented as a curiosity. Second, the dialetheist alternative to orthodox mathematics is hastily described and dismissed. Burgess criticism to relevantistic logics ends by showing that either the "first degree" fragment is incompatible with the "purely implicational" one, or the resulting combined system is undecidable and uninterpretable in a natural heuristic way.

Chapter Six deals with Intuitionistic Logic (pp. 121-142). As far as sentential logic is concerned, the Heyting axiomatization is presented, with proofs of some basic theorems and a whole section devoted to the intepretation of double-negation and to the relation between intuitionistic and classical sets of theorems. Gödel's modal interpretation is presented (and illuminated by means of the notion of Kripke model), and then the proof of soundness and that of completeness are offered. Also, two intermediate systems are briefly described, and finally a system of intuitionistic predicate logic is presented, with the corresponding extension of the notion of Kripke model and a brief remark about the undecidability of intuitionistic monadic predicate logic. A final section on completeness, at first seeming to find some promise in the notion of lawless choice sequence, ends nevertheless with a pessimistic diagnosis of the situation.

In sum, the book offers a fairly accessible survey of a selected group of nonclassical logical systems and their metalogical properties. A number of typographical errors that should be corrected have been pointed out by L. Humberstone in a previous review: *The Bulletin of Symbolic Logic* 16/3 (2010) 411-413. A double use will be possible, both as a textbook for a course on non-classical logics, and as a guide for non-specialists who need an introduction to the sub-

ject: in fact, the work is mainly intended to equip the reader to follow basic applications in analytic philosophy (p. vii). In my opinion, it can also be a good starting point for exploring philosophical questions about logic, importantly by pondering the reasons for Burgess sympathies and antipathies.

Paloma Pérez-Ilzarbe (Pamplona)

If non-classical logics are philosophical logics, then intuitionistic logic is a form of classical logic, and intuitionistic logic is certainly of great philosophical interest. But intuitionistic logic was invented by and for mathematicians. Â As Grayling states, philosophers would not approach these questions in the way they do were it not for the invention of symbolic systems of logic. Philosophy of logic, the study, from a philosophical perspective, of the nature and types of logic, including problems in the field and the relation of logic to mathematics, computer science, the empirical sciences, and human disciplines such as linguistics, psychology, law, and education. Â The term logic comes from the Greek word logos. The variety of senses that logos possesses may suggest the difficulties to be encountered in characterizing the nature and scope of logic. Philosophical Logic is a clear and concise critical survey of nonclassical logics of philosophical interest written by one of the world's leading authorities on the subject. After giving an overview of classical logic, John Burgess introduces five central branches of nonclassical logic (temporal, modal, conditional, relevantistic, and intuitionistic), focusing on the sometimes problematic relationship between formal apparatus and intuitive motivation. Philosophical logic. Quite the same Wikipedia. Just better. Â Philosophical logic refers to those areas of philosophy in which recognized methods of logic have traditionally been used to solve or advance the discussion of philosophical problems.[1] Among these, Sybil Wolfram highlights the study of argument, meaning, and truth,[2] while Colin McGinn presents identity, existence, predication, necessity and truth as the main topics of his book on the subject.[3]. In philosophical logic and metaphysics there is a long-standing debate around the most appropriate structures to represent indeterministic scenarios concerning the future. We reconstruct here such a debate in a computational setting, focusing on the fundamental difference between moment-based and history-based structures.