



BOOK REVIEW

Logic and Mathematics in the Southern Hemisphere: The Legacy of Rolando Chuaqui Kettlun

WILFREDO QUEZADA PULIDO and CARLO APABLAZA ÁVILA (eds.),
Rolando Chuaqui Kettlun: Matemáticas, filosofía e interdisciplina,
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Abstract. The study by Wilfredo Quezada Pulido and Carlo Apablaza Ávila offers a comprehensive reconstruction of Rolando Chuaqui Kettlun's career, articulating his intellectual biography, philosophical work, and interdisciplinary contributions. It highlights his role in the development of logic and mathematics in Chile and clarifies his formative and collaborative ties with Alfred Tarski and Newton da Costa.

Keywords: Rolando Chuaqui Kettlun; Logic in Chile; Mathematics in Chile; Alfred Tarski; Newton da Costa

1. Introduction

Rolando Basim Chuaqui Kettlun (1935–1994) was the most important Chilean logician of the twentieth century; alongside the Mexican Gonzalo Zubieta and the Argentine Andrés Raggio, he was among the first professional logicians of Latin American origin to develop original research in the discipline ([Aliseda and Manzano Arjona, 2015](#), p. 124). However, until a few years ago there was no serious study of his philosophical trajectory or of his role in the development of the formal sciences in Chile.

Aware of this, Wilfredo Quezada Pulido and Carlo Apablaza Ávila (1990–2023) pursue a twofold purpose in the book (2022, p. 9). On the one hand, it brings together a representative selection of Chuaqui's philosophical work, including both previously published articles and unpublished texts. On the other, it reconstructs his fascinating biography.¹ The authors also include a generous catalogue listing the entirety of Chuaqui's works (written either in English or in Spanish) for interested readers (Quezada Pulido and Apablaza Ávila, 2022, pp. 213–223).

The son of Syrian immigrants, Chuaqui began his higher education by studying medicine at the University of Chile. During this period, he received informal instruction in logic from the German mathematician and naturalist Karl Grandjot Reins (1900–1979). This led him to undertake postgraduate studies in the Department of Mathematics and the Department of Philosophy at the University of California, Berkeley, in 1965, where he obtained his doctorate in Logic and the Methodology of Science.

Upon returning to Chile, Chuaqui joined the Department of Mathematics in the Faculty of Exact Sciences at the University of Chile, and also taught at the Inter-American Centre for the Teaching of Statistics (CIENES) (Quezada Pulido and Apablaza Ávila, 2022, pp. 35–36). Later, at the Pontifical Catholic University of Chile, he promoted the modernisation of the basic sciences through the creation and coordination of the institutes of Physics, Chemistry and Mathematics. In 1969 he assumed the deanship of the Area of Exact Sciences, from which the Postgraduate Programme in Exact Sciences (PEPCE) was established. He served as its coordinator on more than one occasion, and it sought to develop advanced research at the local level (Quezada Pulido and Apablaza Ávila, 2022, pp. 37–46).

In parallel, he built Latin American networks in logic by organising the Latin American Symposium on Mathematical Logic (SLALM) in Santiago, Chile (1970), chairing the Advisory Committee for Logic in Latin America, and sustaining its continuity over time (Quezada Pulido

¹ An initiative first developed by Quezada Pulido and Lewin (2007). This work may also be regarded as the first major reconstruction of the relationship between Rolando Chuaqui and philosophy, as well as of the subsequent philosophical uptake of his theses in debates internal to the discipline by authors other than Chuaqui himself (Quezada Pulido and Apablaza Ávila, 2022, pp. 52–60), though not the only one (Álvarez Lisboa, 2023).

and Apablaza Ávila, 2022, pp. 40–41, 44–45).² This Latin American dimension was not merely institutional; it was also sustained by dense personal and intellectual exchanges. Chuaqui's connection with Newton da Costa, and more broadly with Brazilian logicians, seems to have been deeper and more enduring than a passing reference might suggest. Beyond their jointly authored work, their co-edited volumes, and their broader collaborations with other logicians,³ the relationship took shape through academic visits, shared supervision, student circulation, and the collaborative milieu surrounding the SLALMs. A particularly telling expression of that network is the volume *Non-Classical Logics, Model Theory, and Computability: Proceedings of the Third Latin-American Symposium on Mathematical Logic (Campinas, Brazil, 11–17 July 1976)*, edited by A. I. Arruda, N. C. A. da Costa, and R. Chuaqui (1977).⁴ Seen in this light, Chuaqui emerges not only as a Chilean organiser of local institutions, but as a decisive mediator in the consolidation of a genuinely transnational logical community in South America.

At the national level, he chaired the Committee on Basic Sciences of the Council of Rectors of Chile (1974–1976) and arranged Alfred Tarski's visit, seeking to maximise its cross-institutional impact through seminars and lectures at the Pontifical Catholic University of Chile, the University of Valparaíso, the Pontifical Catholic University of Valparaíso and the Federico Santa María Technical University (Quezada Pulido and Apablaza Ávila, 2022, pp. 43–44). In terms of disciplinary institutionalisation, he directed the Institute of Mathematics, headed the Postgraduate Programme in Mathematics and served as Dean of the Faculty

² The SLALM was subsequently held in Brasília, Brazil (1972), Campinas, Brazil (1976), Santiago, Chile (1978), Bogotá, Colombia (1981), Caracas, Venezuela (1983), Campinas, Brazil (1985), Paraíba, Brazil (1989), Bahía Blanca, Argentina (1992), Bogotá, Colombia (1995), Mérida, Venezuela (1998), San José, Costa Rica (2004), Oaxaca, Mexico (2006), Paraty, Brazil (2008), Bogotá, Colombia (2012), Buenos Aires, Argentina (2014), Puebla, Mexico (2017), Concepción, Chile (2019), San José, Costa Rica (2022), and Montevideo, Uruguay (2024). The first four meetings are especially noteworthy: they alternated between Chile and Brazil, thereby consolidating the symposium's earliest institutional axis. The latest edition, the XXI SLALM, was held in Bogotá, Colombia, from 1 to 5 June 2026.

³ These collaborations were quite extensive (Arruda et al., 1978, 1980; Caicedo et al., 1985; da Costa and Chuaqui, 1985, 1988; da Costa et al., 1996; Mikenberg et al., 1986).

⁴ Ayda Inez Arruda is likewise a figure of the utmost importance in the history of logic in Latin America. See Secco and Álvarez Lisboa (2022).

of Mathematics at the Pontifical Catholic University of Chile; he also founded and chaired the Chilean Mathematical Society and became a full member of the Chilean Academy of Sciences, while maintaining ties with the Association for Symbolic Logic (Quezada Pulido and Apablaza Ávila, 2022, pp. 46–47). Chuaqui’s research covered a breadth of topics arguably unmatched by any other mathematician in Chilean history (Quezada Pulido and Apablaza Ávila, 2022, p. 18). On the side of the formal sciences, he worked in set theory, model theory, probability theory and universal algebra. On the side of philosophy, he devoted attention to metamathematics, logic, philosophy of science, epistemology, philosophy of mind and even theology.

All of the above has earned him the distinction of being regarded as a “*Founding Mathematician and Philosopher*” (Quezada Pulido and Apablaza Ávila, 2022, p. 68, emphasis in original), owing to his pioneering drive to “create a school” in Chile and to orient his academic life towards developing the country’s science by activating and institutionalising scientific research. He defended the existence of a continuum between theoretical research (scientific and philosophical) and applied science, and sought to capitalise on it through the creation of interdisciplinary networks and the establishment of programmes of study and research initiatives carried out in Latin America. His indefatigable character is also emphasised, as is his decision to abandon medicine in order to devote himself exclusively to mathematical logic. His name remains visible today in the *Jornadas Rolando Chuaqui Kettlun de Filosofía y Ciencias*, an academic meeting held annually (since 1999) that brings together work at the interface between philosophy and the sciences — with an emphasis on logic and philosophy of science — in his honour; and in the PENTA UC programme at the Pontifical Catholic University of Chile, the latter being the continuation of the Mathematical Talents Programme managed by Chuaqui to increase young Chileans’ public interest in mathematics (Quezada Pulido and Apablaza Ávila, 2022, pp. 60–69).

In what follows, we will focus our attention on commenting on the chapters of the volume. For the convenience of the Anglophone reader, all the titles of the texts will be translated into English.

2. Platonism, Truth and Probability

This section brings together three articles devoted to Alfred Tarski, mathematical Platonism and probability: “Alfred Tarski: Mathematician of Truth” (1984), “Platonism and Mathematics” (1980) and “Probability: A Confluence of Philosophy, Science and Practical Applications” (1992). The first piece is a posthumous tribute prompted by Alfred Tarski’s death in 1983. Chuaqui foregrounds the core of Tarski’s contributions in relation to his notion of truth, his treatment of paradoxes and the role of metalanguage. Chuaqui’s relationship with Tarski was dynamic and steadily intensifying. It began with the intellectual admiration produced by reading his texts; over time, that link became a relationship between colleagues and culminated in a close friendship. Even so, Chuaqui did not adopt a doctrinaire allegiance, nor did he become a Tarskian. Chuaqui’s respect for Tarski is expressed less as theoretical imitation than as methodological affinity, as can be seen in his appreciation of collaborative work and his promotion of the organisation and institutionalisation of mathematical initiatives in Latin America, such as the aforementioned SLALM.

Chuaqui’s Platonist approach, developed in the second text, focuses on the notion of number and the existence of this kind of mathematical object.⁵ Chuaqui clearly presents the historical beginnings of Platonism through the mathematical advances made from the seventeenth century onwards. He proceeds in this way until he reaches the contemporary Platonist elements of classical mathematics, such as impredicative definitions (e.g., the Vicious Circle Principle and actual infinity), which, for Chuaqui, provide sufficient grounds for believing that such mathematical objects are independent of our existence.

Chuaqui’s final article in this section helps to elucidate one of the fundamental pillars of his philosophy: interdisciplinarity. In probability, areas such as philosophy and mathematics (both pure and applied) converge. Chuaqui’s first major work on probability was his doctoral thesis, *A Definition of Probability Based on Equal Likelihood* (1965), supervised by David Blackwell. In that work, Chuaqui seeks to enrich probability with a new notion and its corresponding formal foundation. However, the article in question, included in the volume, is the key manifesto of his view of probability and of how different fields come together to address

⁵ For further discussion, see (Chuaqui, 1980).

it. Finally, Chuaqui offers a refined conception of probability, which has three foundations:

1. Probability is based on an objective notion;
2. Probability is a measure of the possibility of truth;
3. The classical definition of probability is essentially correct.

3. Scepticism

Although it is true that one of the most interesting features of Chuaqui's philosophy — distinctive of the mathematician's intellectual maturity — was his adherence to Mathematical Platonism, he was never dogmatic about his own position, nor did he seek to influence his students to adopt that conception of mathematics. Indeed, many of his students or close disciples, such as Wilfredo Quezada or Rolando Rebolledo, are closer to a Mathematical Naturalism. Nevertheless, what was a personal mission for the author was the fight against every kind of sceptical philosophy, or philosophy tending towards scepticism. Professor Chuaqui was a public enemy of scepticism — an enmity that was not merely a propagandistic or rhetorical stance adopted before his students, but one that was given expression in writings such as those we shall examine below.

The first text, unpublished and written during his doctoral studies at Berkeley (1961–1965), is entitled “Can We Know Matters of Fact with Certainty?”, and aims to address the problem of certainty in such a way that any kind of deflationism regarding this concept is refuted. The argumentative strategy employed can be characterised as Cartesian, insofar as the text reads like a modern meditation with an emphasis on, and support from, mathematics. The second article, “Logical Analysis of Sceptical Arguments” (1992–1993), aims to attack sceptical theses directly. The analytical tool brought to bear on sceptical judgements is epistemic logic. The author formalises the sceptical premises using logic in order to show their inconsistency or unworkability. In particular, the sceptical arguments that the Chilean logician seeks to target are the “Cartesian Argument” and the “Berkeley and Hume Argument”.

4. Science, Philosophy and Society

The two texts contained in this chapter are unpublished works written between 1992 and 1993, and they provide an in-depth analysis of the

phenomenon known as ‘technoscience’. The first of them, “Impact of the Scientific-Technical Revolution on Contemporary Society: the Scientific-Technological Continuum and Its Impacts on Society’s Epistemological Conceptions” (1992), locates that impact in a kind of mutation of our epistemic norms. In his view, technological success reorganises what we understand by evidence, method and certainty. Even where there is high predictive efficacy, scientific acceptance remains revisable and is constrained by logical–mathematical limitations (e.g., consistency problems and incompleteness results). In response to Cartesian-style scepticism and to Bertrand Russell’s now-classic “Argument from the table”, Chuaqui grants that experience does not guarantee infallible access to external objects, but denies that their non-existence follows from this. At most, it is appropriate to speak of fallibility.

The second text, “Philosophy, Science and Technology: Two Examples” (1993), is perhaps the most metaphilosophical of those included in the compilation. Chuaqui adopts a naturalist commitment, explaining the continuum between science, philosophy and technology by means of illustrative cases. The first concerns the foundations of probability and statistical inference: the application of particular statistical techniques is not equivalent to justifying them, since the choice of procedures depends on a certain semantic interpretation of probability and on the epistemic rules of acceptance or rejection adopted by each school. The second example, more striking, is linked to the cognitive sciences — specifically, to artificial intelligence and to the question “Is the mind a computer?”. After introducing Turing machines (including UTMs) and the Turing thesis (according to which mental activity would be capturable by an effective procedure), Chuaqui points to a metamathematical limit: for any algorithmic system that is sufficiently expressive and consistent, one can construct a self-referential arithmetical sentence such that, if the system were to decide it, it would become inconsistent; consequently, neither the sentence nor its negation is provable or decidable within that system. We face a dilemma: either the mind exceeds every Turing machine, or there are problems that the mind can formulate but that, in principle, it cannot decide. If the Turing thesis is accepted in a strong sense, the second alternative prevails, and the limitation ceases to be empirical and becomes structural — i.e., there are metatheoretical limits to the claim that a consistent and sufficiently expressive algorithmic system can decide all arithmetical truths, so that there are propositions or problems that are undecidable.

5. Logic and Scientific Application

In this final section, another of Chuaqui's personal maxims is presented: collaboration and communication between pure and applied mathematics. Beyond methodological differences, interests, or the theories by which they are shaped, they must operate together, insofar as everything is connected. The two texts included here are "Interpretations and Models in Science" (1985), co-authored with Newton da Costa, and "Logical Bases of Medical Diagnosis and Decision-Making" (1993).

The first text is particularly interesting for those who work in philosophy of science and in the applications of logic to science. The way in which the authors anticipate the debate on models in science is striking; likewise, they identify the central core of the discussion of models: their interpretation. For them, to discuss or talk about models in science inexorably involves analysing the language in which we work—in this case, the logical language. Model theory would be the central logical tool for working with models in science. This thesis is especially relevant because, in contemporary discussions of scientific models, the philosophical concept of a model is rarely distinguished with care from model theory as a logical-mathematical discipline. Moreover, the progressive abandonment of the latter in the field has favoured predominantly abstract approaches—in the sense of conceptual ones—and has weakened recourse to formal methods in philosophical research. At this point, Rolando Chuaqui's position is consistent with his defence of interdisciplinary work: the acquisition of formal tools constitutes a methodological condition for addressing philosophical problems with rigour. The current landscape contrasts with that ideal, insofar as the discussion tends towards increasing over-specialisation which, frequently, operates as a mechanism for excluding other areas of knowledge.

The second text returns to Chuaqui's academic origins. Before becoming a respected mathematician, he qualified as a doctor. The author seeks to provide a logical foundation based on probabilities, articulated through inductive inference and decision theory, for a formal justification of medical decisions. The text can be approached from different perspectives, beyond Chuaqui's principal intention. For example, we might read it as a model of artificial intelligence or as a formal approach to the philosophy of medicine. In short, Chuaqui commits himself to a way of practising medicine in which health science and formal methods enter into dialogue with one another. Once again, interdisciplinarity

must, in his view, be the basis of any scientific practice carried out with reasonable rigour.

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ESTEBAN ECHANIZ

Universidad de Santiago de Chile (USACH)

Santiago de Chile, Chile

esteban.echaniz@usach.cl

<https://orcid.org/0000-0002-6667-5436>

GABRIEL DONOSO UMAÑA

Universidad de Santiago de Chile (USACH)

Fundación Centro Interdisciplinario de Ética, Política y Economía

Santiago de Chile, Chile

gabriel.donosou@usach.cl

<https://orcid.org/0000-0002-4842-1387>