INTRODUCTION

Throughout the short history of modern logic, Hugh MacColl's (1837–1909) pioneering achievements have scarcely been received with adequate esteem. In 1877, two years before the *Begriffsschrift*, he published the first purely symbolical presentation of a variant version of propositional logic. J. M. Bocheński, one of the few scholars familiar with his early system, judged it to be "the climax of mathematical logic before Frege". Towards the end of the century MacColl developed the first modal system in the history of modern logic. Twenty years before Lewis, he defined the concept of strict implication, and earlier than Peano he accounted for inclusion by means of implication.

In spite of some benevolent acknowledgements, neither MacColl's contributions to the development of logic nor the philosophical context in which they came forth have been investigated with appropriate attention. Only during the second half of the 20th century have MacColl's major domains of research, i.e. modal and non-classical logic, gradually turned into acclaimed fields of interest. By then, however, their exploration could rely on methodological standards that for MacColl were not within reach. In addition to such general reasons, specific obstacles have hindered serious efforts to investigate his account of logic. Most of MacColl's articles and books are not readily available. A reliable and comprehensive bibliography has not been published. Had MacColl benefited from an ordinary academic career his works would most likely have come down to us in a more accessible form.

The colloquium on *Hugh MacColl and the Tradition of Logic*, held at the Ernst-Moritz-Arndt University of Greifswald from 29 March to 1 April 1998, was designed with the intention of initiating serious research on this author whose predominant intent was "to bridge the gulf between Symbolic Logic and the Traditional". We are pleased to publish here the proceedings of this colloquium.

Theories of logic are naturally supposed to strive for utmost generality. Nevertheless, their invention depends on specific historical conditions, even beyond the realm of the formal sciences. MacColl's contributions to logic draw on progress in disciplines such as algebra, analysis and probability theory. Likewise, they depend on some of the author's philosophical assumptions and comply with his metaphysical and religious beliefs. Finally, MacColl's literary works allow us a comprehensive grasp of his views on the human condition. The articles in this volume touch upon these different subjects and perspectives. In this way they evidence the truly interdisciplinary intention with which the colloquium was designed: MacColl's various contributions to the history of symbolic logic should be presented and discussed not just with reference to the field's internal development. Without concern for their broader, cultural preconditions, the occurrence, relevance and meaning of his achievements cannot receive an appropriate understanding.

Due to this methodological stance, the colloquium has also led to a detailed inquiry into MacColl's biography and the conditions of his personal life. The results of this research will be published separately.[1] However, a résumé of our findings is appropriate here.

MacColl was the youngest child of six born to a tenant-farmer in Argyllshire in the Highlands of Scotland in January 1837. His father John died when Hugh was only a year old. His elder brother Malcolm, ordained in the Episcopal Church of Scotland and later in the Anglican Church, tried to support Hugh's education. Hugh became a schoolmaster in England in the late 1850s, eventually moving to France in 1865, settling with his growing family in Boulogne-sur-Mer, where he taught Mathematics (and other subjects) for some forty or more years. He took an External London degree in Mathematics in 1876.

MacColl's literary production falls within four main periods. There is an initial period from around 1870 to the early 1880s in which, arising from the solution of problems in such magazines as the *Educational Times*, he developed logical methods in what is now known as the Boole-Schröder class calculus—featuring prominently in Schröder's huge survey *Lectures on the Algebra of Logic*. From the early 1880s, around the time of his first wife's death, until around 1896 he devoted himself to literary and philosophical studies, publishing two novels. From 1896 he returned to logic, publishing a series of articles which culminated in his book *Symbolic Logic and its Applications* of 1906. In his final years he returned to philosophy, publishing a book on *Man's Origin, Destiny and Duty* in 1909, the year of his death.

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[1]M. Astroh, I. Grattan-Guinness, S. Read, "A Biographical Survey on Hugh MacColl (1837–1909)", forthcoming in *History and Philosophy of Logic*.

The colloquium at Greifswald was organised and designed as a component of a larger research project on *The Writings of Hugh MacColl on Logic, Philosophy and Mathematics*. It is being carried out in cooperation with A. J. I. Jones and J. W. Klüwer of the University of Oslo. Meeting the difficulty of getting hold of MacColl's scattered publications, the project will in due course lead to a comprehensive and critical edition of his various publications and correspondence, with a matching bibliography (a pre-print of the bibliography is available at the NJPL web site).

Several initiatives in investigating MacColl's theories on logic have preceded the present one and thus contributed to the setting up of this project. Hence they should be mentioned here. During the nineteen-eighties C. Thiel and V. Peckhaus at the Friedrich-Alexander University of Erlangen carried out a wide-ranging research project on the social history of logic. In the course of their investigations considerable attention was paid to Hugh MacColl. The research reports of 1986 and 1989 by A. Christie, one of their collaborators, contain valuable information on MacColl's biography and the range of his writings. Unfortunately, Christie could not continue his research work on MacColl, so for some years the subject was not pursued any further.

In 1990 and 1991 research seminars at the Friedrich-Schiller University of Jena and the University of the Saarland, organised by M. Astroh, G. Heinzmann and W. Stelzner, focused on MacColl's contributions to logic. Results of this research were presented at the *Frege-Kolloquium*, held at Jena in 1991. Moreover, these joint efforts led to a research project by M. Astroh and K. Lorenz on *Der Begriff des Integrals in den frühen Schriften MacColls*. It was carried out by S. Rahman. His Habilitationsschrift, *Die Logik der zusammenhängenden Sätze im frühen Werk von Hugh MacColl*, partially resulted from these investigations.

With the kind permission of Professor Thiel, it was possible to use Christie's initial research in order to outline the research project on MacColl's writings from which the preparation of this volume ensues. Thus far, the project has led to a colloquium on a pioneer of modern logic whose work contributed to the historical continuity of logical research. In turn the edition of his writings will profit considerably from the efforts of those who contributed to these proceedings.

This volume is divided into two major parts, "History of Logic" and "Philosophy, Theology and Literature". Under the former heading, some contributors concentrate on major issues of MacColl's mature system of modal logic, developed in the years 1895–1905. Others investigate the reception of MacColl's work by eminent authors of his time:

1) I. Grattan-Guinness (Middlesex) looks at the reception of MacColl's ideas on logic in the period immediately around the publication of *Symbolic Logic and its applications* in 1906. MacColl's main critic was Bertrand Russell. MacColl's advocacy of logical pluralism was silenced by Russell's authority.

2) V. Peckhaus (Erlangen) looks back at the much more favourable reception of MacColl's earlier logical work in Germany in the 1880s. But this meant that MacColl's work was eclipsed and forgotten in later years as the conception of logic changed with the turn of the century.

3) S. Rahman (Saarbrücken) sets out from MacColl's notion of symbolic existence, over which he tangled with Russell at the time Russell was trying to free himself from his own not dissimilar views. He uses it to motivate developments of the dialogical logic of Lorenzen and Lorenz. The dialogical free logic which results is even able to contain paraconsistency.

4) S. Read (St. Andrews) gives a systematic development of MacColl's modal algebra, and shows that the basic modal algebra developed by MacColl was Feys' system T. Adding MacColl's conditional operator brings with it the paradoxes of strict implication, a consequence which can be avoided in a more subtle modal construction.

5) P. Simons (Leeds) shows that MacColl's logic is not many-valued, since it is not value-functional. It was intended, and is interpreted better, as a modal probability logic.

6) W. Stelzner (Jena) shows how MacColl's notion of a proposition is context-relative. Accordingly, '*A* is true' is interpreted as reporting the value of *A* in a fixed *de re* situation.

7) G. Sundholm (Leiden) considers MacColl's account of logical consequence. MacColl, like many other logicians of his time, was insensitive to the "Frege-point", that the logical connectives do not connect assertions or judgments but contents of those assertions. The same content can occur both asserted and unasserted.

8) J. Woleński (Cracow) demonstrates the full subtlety of MacColl's treatment of the modalities, in particular, MacColl's notion of a variable—a statement which is possible but uncertain.

Another three articles focus on the wider intellectual context in which MacColl developed his scientific work:

1) M. Astroh (Greifswald) considers MacColl's reaction to Darwin and the doctrine of evolution. MacColl's account of logical form is firmly set in a linguistic theory much influenced by Max Müller's account of the historical development of language.

2) S. E. Cuypers (Leuven) turns to MacColl's last work, on the meaning of life, developing a divine-law conception of ethics. In this,

he opposed Haeckel's explanation using evolutionary biology, wishing to separate the physical sphere where evolution has its place from the human sphere of life, reproduction and mind.

3) S. H. Olsen (Hong Kong) broadens the canvas yet further to set MacColl in his cultural background, mid-century Victorian Britain, a world which changed around him while he remained true to his early upbringing, not least his mother's Puritan and Presbyterian inheritance. Nonetheless, MacColl's novels show his yen to participate in the advancement of science and extension of education in the late nineteenth century.

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