Boole 1815-1864. L'Oiseau de nuit en plein jour, par Souleymane Bachir Diagne avec des notes et annexes de Marie-José Durand. Paris, Belin, 1989. 262 pages.

Reviewed by

Theodore HAILPERIN

Department of Mathematics, Lehigh University
Bethlehem, Pennsylvania, 18015 USA

The book under review is a volume in the collection "Un savant, une époque," designed to present history through the biographies of scientists. It is apparent that the author has made an extensive study of the secondary literature on Boole's life and work. The material is nicely presented in a compact readable monograph.

There are four chapters comprising 200 pages, plus 10 appendices of about 40 pages more, though no index. Chapter one is an account of Boole's personal development: shoemaker's eldest son, recognized early as highly gifted, impelled by family exigencies to take on, at age 16, financial responsibility by becoming assistant to a schoolmaster, starting at age 21 his own boarding school, teaching himself higher mathematics, writing research papers, one of which was awarded a Royal Society gold medal and, though without formal higher education, applied for and was appointed in 1849 to be the Professor of Mathematics at the newly established Queen's College in Cork. Married late in life to Mary Everest – who survived him by some 50 years – he fathered 5 daughters, all of whom turned out to be remarkable, though left fatherless when the eldest was 8 years old.

Chapter two describes the then contemporary ideas conducive to Boole's creating an algebra of logic: symbolical algebra, the calculus of operators, and the 'new analytic' – in logic the recognition that Aristotle may not have said the last word on the syllogism. In this connection the acrimonious plagiarism dispute between De Morgan and Sir William

Hamilton (Professor of Logic and Metaphysics at Edinburgh) concerning the 'quantification of the predicate' is credited (by Boole himself) with having stimulated the writing of *The Mathematical Analysis of Logic*, Boole's first work in logic. Diagne ends this chapter with a quotation from Hamilton which includes the phrase 'an owl in daylight,' and which he takes as an epithet for Boole. We shall be discussing this presently.

Boole's peculiar algebraic method for doing logic (of terms, and of propositions) is the subject of Chapter 3. Despite Boole's claim it is not the algebra of 0 and 1. Other numerical values come in as well as strange constructs such as 0/0 and 1/0. Also special techniques of interpretation are needed to get back to logically understandable notions. Diagne summarizes Boole's system as it is given in *Laws of Thought*. There is no mention of the research in this century in which rationales for Boole's method and for its relative success are given.

A concluding chapter, "Remorse," takes its theme from an essay possibly part of a larger work – found in Boole's *Nachlass*. In it Boole expresses regret that in writing the *Laws of Thought* he was "too much under the dominion of mathematical ideas;" now he hopes to reexpress his work without symbolism and in the language "familiar to the logicians of Oxford." Mansel's (*1851*) *Prolegomena Logica* is specifically mentioned. Boole should have stayed with his original views. The subsequent florescence of logic showed the importance of introducing mathematics-like symbolism. Boole's dissatisfaction stemmed not only from a too close adherence to numerical algebra but also from the lack of a semantics to go with his formalism. It was only in the 1930's that a clear understanding of the need for a semantic grounding for logic emerged, and one for his peculiar algebra of logic (not Boolean algebra) did not appear until 1976.

We return to the author's "an owl in daylight" which he uses as a title of a chapter, as a subtitle for the book, and as an epithet chracterizing Boole. The phrase comes from an essay of Hamilton's on De Morgan's use of "notions" in logic. We reproduce the passage quoted by Diagne, in the original English and with a bit more of the context.

> ...and we have again authority and demonstration, that Mathematics are not a road of any kind to Logic, whether to Logic speculative, or to Logic practical. A *road* to Logic, did I say?

> It is well, if Mathematics, from the inevitability of their process, and the consequent inertion, combined with rashness, which they induce, do not positively ruin the reasoning habits of their votary. Some knowledge of their object-matter and method is requisite to the philosopher, but their study should be followed out temperately and with due caution. A mathematician in contingent matter is like an owl in daylight. Here, the wren pecks at the bird of Pallas, without anxiety for beak or talon; and there, the feeblest reasoner feels no inferiority to the strongest calculator.

It is clear that Hamilton would have directed his criticism, intended for De Morgan, equally as well at Boole. We have no complaint about Diagne's transference of it to Book. But are these strictures of Hamilton's justified? As far as Logic speculative is concerned, reference to the history of logic in the 150 years since Hamilton wrote this shows how badly wrong he was. And as for Logic practical we need only point to the examples of logical analysis of contingent matters (in Chapter XIII of *Laws of Thought* to judge Boole's capabilities on this score. With regard to Hamilton's abilities we have the remark of De Morgan in *Formal Logic* (*1847*, 308): "I am tediously often obliged to bring the whole matter to its A B C; but what else can I do with an opponent [Hamilton] who writes an *ignoratio elenchi* of forty-four pages long."

Leaving aside what we believe to be an inappropriate subtitle, we would describe Diagne's four chapters as a good account, engagingly written, of the man, his contribution to logic, and of the significance of his ideas for intellectual history. Not written for the expert but for a general audience, it seems to achieve its intended goal.

Responsibility for the notes and appendices resided with a secondary author. This additional material is placed together after the body of the monograph so as not to interrupt the narrative flow. Regretfully there is evidence of inadequate redacting care. We found numerous misspellings of proper names, typographical errors, misspellings of words in English titles (as if they were French), incorrect dates for Boole's two books on logic, and a paper of Boole's in the bibliographical list of his works, whose title

contains the title of a paper of Wilbraham's, is broken up into two papers both attributed to Boole.

The main text is clear of such blemishes. I found only one error: a picture on page 20 is captioned "The boarding school at Waddington, near Lincoln, which Boole directed from 1838 to 1849 before occupying the chair of professor of mathematics at Queen's College, Cork." Actually it is the building of Boole's school at No. 3 Pottergate in Lincoln. Perhaps we should also note that, of all Englishmen mentioned in the book, Augustus De Morgan was the only one who had his name gallicized — to "Auguste de Morgan." Was the warrant for this his being a descendent of Huguenots?

REFERENCE

Augustus DE MORGAN. 1827. *Formal logic: or, the calculus of inference, necessary and probable*, London.

Henry Longueville MANSEL. 1851. *Prolegomena Logica. An Inquiry into the psychological Character of logical Processes*, Oxford; 2nd edition, corrected and enlarged, Oxford, Henry Hammans, 1860.