The Other Mathematics: Language and Logic in Egyptian and in General by Leo Depuydt

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Despite its title, *The Other Mathematics: Language and Logic in Egyptian and in General*, this book by Leo Depuydt addresses the field of Egyptian grammar more directly than the topic of Egyptian mathematics. Yet, although Depuydt addresses grammarians more directly than historians of science, *The Other Mathematics* takes the work of George Boole as an unexpected point of departure for an analysis of conditional sentences in Old, Middle, and Late Egyptian as well as Coptic—but not Demotic: although Depuydt has published Demotic texts, *The Other Mathematics* omits this phase of the Egyptian language. Historians of science and mathematics will not find presentations of familiar texts from Egyptian mathematics, or new editions of previously unpublished texts, or even a reinterpretation of various enumerations, lists, and tables as a type of mathematical structure. Rather, the title refers to 'attribute mathematics' in which 'all things sharing an attribute together form a class or set' [16]. By definition, then, *The Other Mathematics* excludes numbers and focuses on symbolic logic, 'nothing more or less than. . . a kind of mathematics' [40]. However, because this approach applies modern logic only to ancient grammar, *The Other Mathematics* has next to no relevance to the idea and practice of science within an Egyptian context and only a limited bearing on the idea and practice of science outside of Egypt.

Depuydt provides a clear key to the reader when he summarizes the contents of his book [11–13] and identifies the first five chapters as a logical unit which establishes the differences between two sentence types, conventionally translated as conditional sentences. Chapter 1 establishes the grammatical structure of these two sentence types. Chapter 2 reviews the development of symbolic logic,

but be forewarned: this recapitulation is limited to six pages. Chapter 3 occupies a single page and provides a definition of the difference between the two sentence types with reference to the types of statements categorized by Boole and Venn. Chapter 4 summarizes the logical properties which must be addressed by the two Egyptian sentence types. Chapter 5 collects examples which express these properties from the corpus of Egyptian literature. Depuydt provides a clear overview to these chapters in the contents and has composed the chapters according to a rigorous logic. The ease of reference and clarity of structure outweighs the criticisms of uneven, choppy, or repetitive writing.

The 'second unit' contains five chapters which depend on the conclusions of the 'first unit'. Chapter 6 establishes the logical certainty of the conclusions of the first unit. Chapter 7 considers the condition *sine qua non* as a special case of the conditional sentence. Chapter 8 presents important information for grammarians of the Egyptian language: an exhaustive compilation of 'balanced sentences'. In Chapter 9, Depuydt presents a remarkably lucid and readable account of the historical development of grammatical forms from the decipherment of hieroglyphics to modern debates. Chapter 10 considers a special case of the *sḏm.f* verb. Chapter 11 argues that the Egyptian language increased in complexity and sophistication of expression as it developed over time. Chapter 12 derives rules from the first unit and explains away several commonly accepted features of the Egyptian verb.

Four appendices follow the second unit. The first two appendices contain articles which have appeared elsewhere; the third relates the mental acts associated with conditions and premises to circuits and switches; and the final one collects errata to Depuydt's previous publications.

The methods and philosophical underpinnings of *The Other Mathematics* merit direct consideration. Depuydt never specifically addresses the topic of Structuralism but because the Boolean 'Laws of Thought' serve simultaneously as a point of departure, as an absolute mathematical truth, and as the means of verification, *The Other Mathematics* may be described as the first Structuralist grammar of the Egyptian language. Depuydt praises Boolean logic because it is demonstrable, certain, and internally consistent [22–23]. Oblique references to the usefulness of Boolean logic in the fields of computer

science [10] and electrical engineering [back cover text, appendix 3] pepper the work. Finally, Depuydt notes that Boolean logic 'supplanted' Aristotelian and scholastic logic [40]. An undeclared Structuralism may explain the potentially anachronistic subjugation of Egyptian grammar to Boolean logic.

Because the topic of language (whether in Egyptian or in general) has limited relevance to the idea and practice of science, the portions of *The Other Mathematics* which treat logic demand closer scrutiny. Perhaps the utility of Boolean logic to computer scientists and electrical engineers has supplanted Aristotelian and scholastic logic in the European tradition, but Depuydt neglects to contextualize this development against the larger backdrop of other logical systems. Indeed, Depuydt's presentation of logic largely limits itself to Boole and Venn, with some additions by Shannon. Depuydt does not discuss the development of logic in non-European contexts. No mention is made of the grammatical rules of Panini, the inferences of Gotama, or the *tetralemma* of Nagarjuna. Likewise, no discussion of the Mohist School of Names appears; nor are Hui Shi or Gongsun Long introduced. An uninformed reader of *The Other Mathematics* might conclude that although some early work on logic had been done by Aristotle [39], Anaximander [43], or Cicero [242], Boole defined the field and all logical systems agree with him. In fact, one interesting result of the development of symbolic logic has been that symbolic logic has enabled paraconsistent logic to be understood as a separate logical system rather than as a fault of translation or a linguistic artifact.

If the topic of logic in general is sidestepped, the topic of logic in Egyptian could be expanded considerably. Depuydt treats only conditional sentences, but what could be said about each of Boole's logical operators? Negation is not a simple matter in the Egyptian language and a discussion of the various negations, rendered into symbolic logic, might prove both illuminating and entertaining. Another problem that demands attention is that of union and disjunction. Depuydt has already written on this topic in *Conjunction, Contiguity, Contingency: On Relationships between Events in the Egyptian and Coptic Verbal System* [1993] but neither expands this work to non-verbal cases nor reports the results as relevant to the topic of logic in general. Still another interesting topic, from a logical perspective, would be a discussion of the range of the use of the Egyptian

word '*ky*' ('other'). Potentially rewarding topics could be multiplied and perhaps Depuydt will visit them in future publications.

BIBLIOGRAPHY

Depuydt, L. 1993. *Conjunction, Contiguity, Contingency: On Relationships between Events in the Egyptian and Coptic Verbal System.* New York/Oxford.