

## Towards an understanding of Meroitic phonology\*

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### 0 Introduction

This paper seeks to address certain aspects of Meroitic phonology, primarily the seemingly random omission of the nasal syllable sign. The Meroitic script exhibits considerable variability in the spellings of the same words, apart from the irregularity of vowel placement, this variability is most apparent in the seemingly random omission of word final coronal consonant graphemes when postpositions, determiners and adjectives are suffixed to the stem nouns where the initial consonants of these suffixes are lateral coronal.<sup>1</sup> These inconsistencies pose serious problems, not only to a standard transliteration of words but also towards any insight into the pronunciation of the Meroitic language. The ability to discern dialectal variation, diachronic change, morphophonemic alternation or simply orthographic errors from each other is wrought with difficulties for any analysis of the Meroitic script. In light of these irregularities, this paper seeks to investigate whether phonological theory in particular a Government Phonology (henceforth GP) analysis is able to propose a working hypothesis of Meroitic phonology, namely (i) the vocalisation of the schwa graphemes and (ii) the assimilation process of nasals and liquids and its exceptions. It is hoped that this study can go towards enhancing the understanding of the Meroite's language.

This paper is organised as follows: §0 presents the background to the script and its grapheme to phoneme correspondence along with an overview of the system of writing and the methods of transliteration and transcription. §1 briefly discusses the typology of the script and the Universalist's approach to script typology. §2 gives an overview of the Meroitic vowels and vowel space taking into consideration universals of vowel inventories. §3 investigates the vowels within GP's elements representation with §4 analysing the constituent structure of Meroitic. The nasal omission is investigated in §5 with a discussion on the failure of Lexical Phonology when applied to Meroitic. A GP analysis is given in §6 of final empty nuclei and its implications in Meroitic with a proposal on the morpho-phonological interface, finally, §7 concludes the paper.

### 0.1 Historical background

The Kingdom of Kush 900BC – 320AD, was one of the most important early civilisations of sub-Saharan Africa. The civilisation, also known as the Kingdom of Napata and Meroe, stretched from the third cataract to the sixth in present day Sudan. The Kushites used a script<sup>2</sup> consisting of 23 distinct graphs for writing their language. The Meroitic script has two forms – (i) a hieroglyphic (monumental) form with characters borrowed from the Ancient Egyptian inventory and (ii) a cursive<sup>3</sup> (handwritten) form similar to Ancient Egyptian Demotic. The hieroglyphic form was used monumentally carved onto temples and in usage is less common compared to the

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<sup>1</sup> It is observed that other phonemes trigger another assimilation process inherent within the Meroitic script such as Hesterman's Sound Law (Folia Ethnoglologica 1925) where  $s \rightarrow t' \_ \#\#1$ .

<sup>2</sup> The script of the Kushites is termed Meroitic.

<sup>3</sup> Cursive is an erroneous term for the handwritten form as the signs (bar one) are not ligatured to one another, but as this is the traditional term it is adhered to.

ursive script. The cursive form is found written on stelae,<sup>4</sup> ostraca,<sup>5</sup> temples and monuments. From archaeological evidence it seems as if the Meroitcs were more familiar with using the cursive form of the script than the hieroglyphs as Griffith (1911) acknowledges that texts which start written in hieroglyphs finish in cursive as if the Meroitcs were not as competent in the hieroglyphic form. The direction of the script also runs right to left, as does Ancient Egyptian (AE) but the hieroglyphic characters face the opposite direction from AE. Even though the dominant influence on the kingdom and on its script was AE, the language does not seem to be derived from AE.<sup>6</sup>

The Egyptologist scholar Griffith (1911) brilliantly established the phonemic values of the graphemes by using a textual analysis, however, apart from a handful of lexical and grammatical items, the language as a whole remains unknown. Various scholars have worked for many years on Meroitic to find a cognate language that would verify the language of the Meroitcs, but so far very little progress has been made.<sup>7</sup>

## 0.2 Meroitic grapheme to phoneme correspondences<sup>8</sup>

An example of the Meroitic cursive script with its transliteration values is given in (1). Since Griffith's initial assignment of phonemic values Macadam (1950) and Hintze (1971) have proposed revisions for the phonemic values for a few of the graphemes which have been accepted and followed within the field of Meroitic studies.

(1) <sup>9</sup>	𐎓	𐎔	𐎕	𐎖	𐎗	𐎘	𐎙	𐎚	𐎛	𐎜	𐎝	𐎞	𐎟	𐎠	𐎡	𐎢	𐎣	𐎤	𐎥	𐎦	𐎧	𐎨	𐎩	𐎪	𐎫	𐎬	𐎭	𐎮	𐎯	𐎰	𐎱	𐎲	𐎳	𐎴	𐎵	𐎶	𐎷	𐎸	𐎹	𐎺	𐎻	𐎼	𐎽	𐎾	𐎿	𐏀	𐏁	𐏂	𐏃	𐏄	𐏅	𐏆	𐏇	𐏈	𐏉	𐏊	𐏋	𐏌	𐏍	𐏎	𐏏	𐏐	𐏑	𐏒	𐏓	𐏔	𐏕	𐏖	𐏗	𐏘	𐏙	𐏚	𐏛	𐏜	𐏝	𐏞	𐏟	𐏠	𐏡	𐏢	𐏣	𐏤	𐏥	𐏦	𐏧	𐏨	𐏩	𐏪	𐏫	𐏬	𐏭	𐏮	𐏯	𐏰	𐏱	𐏲	𐏳	𐏴	𐏵	𐏶	𐏷	𐏸	𐏹	𐏺	𐏻	𐏼	𐏽	𐏾	𐏿	𐐀	𐐁	𐐂	𐐃	𐐄	𐐅	𐐆	𐐇	𐐈	𐐉	𐐊	𐐋	𐐌	𐐍	𐐎	𐐏	𐐐	𐐑	𐐒	𐐓	𐐔	𐐕	𐐖	𐐗	𐐘	𐐙	𐐚	𐐛	𐐜	𐐝	𐐞	𐐟	𐐠	𐐡	𐐢	𐐣	𐐤	𐐥	𐐦	𐐧	𐐨	𐐩	𐐪	𐐫	𐐬	𐐭	𐐮	𐐯	𐐰	𐐱	𐐲	𐐳	𐐴	𐐵	𐐶	𐐷	𐐸	𐐹	𐐺	𐐻	𐐼	𐐽	𐐾	𐐿	𐑀	𐑁	𐑂	𐑃	𐑄	𐑅	𐑆	𐑇	𐑈	𐑉	𐑊	𐑋	𐑌	𐑍	𐑎	𐑏	𐑐	𐑑	𐑒	𐑓	𐑔	𐑕	𐑖	𐑗	𐑘	𐑙	𐑚	𐑛	𐑜	𐑝	𐑞	𐑟	𐑠	𐑡	𐑢	𐑣	𐑤	𐑥	𐑦	𐑧	𐑨	𐑩	𐑪	𐑫	𐑬	𐑭	𐑮	𐑯	𐑰	𐑱	𐑲	𐑳	𐑴	𐑵	𐑶	𐑷	𐑸	𐑹	𐑺	𐑻	𐑼	𐑽	𐑾	𐑿	𐒀	𐒁	𐒂	𐒃	𐒄	𐒅	𐒆	𐒇	𐒈	𐒉	𐒊	𐒋	𐒌	𐒍	𐒎	𐒏	𐒐	𐒑	𐒒	𐒓	𐒔	𐒕	𐒖	𐒗	𐒘	𐒙	𐒚	𐒛	𐒜	𐒝	𐒞	𐒟	𐒠	𐒡	𐒢	𐒣	𐒤	𐒥	𐒦	𐒧	𐒨	𐒩	𐒪	𐒫	𐒬	𐒭	𐒮	𐒯	𐒰	𐒱	𐒲	𐒳	𐒴	𐒵	𐒶	𐒷	𐒸	𐒹	𐒺	𐒻	𐒼	𐒽	𐒾	𐒿	𐓀	𐓁	𐓂	𐓃	𐓄	𐓅	𐓆	𐓇	𐓈	𐓉	𐓊	𐓋	𐓌	𐓍	𐓎	𐓏	𐓐	𐓑	𐓒	𐓓	𐓔	𐓕	𐓖	𐓗	𐓘	𐓙	𐓚	𐓛	𐓜	𐓝	𐓞	𐓟	𐓠	𐓡	𐓢	𐓣	𐓤	𐓥	𐓦	𐓧	𐓨	𐓩	𐓪	𐓫	𐓬	𐓭	𐓮	𐓯	𐓰	𐓱	𐓲	𐓳	𐓴	𐓵	𐓶	𐓷	𐓸	𐓹	𐓺	𐓻	𐓼	𐓽	𐓾	𐓿	𐔀	𐔁	𐔂	𐔃	𐔄	𐔅	𐔆	𐔇	𐔈	𐔉	𐔊	𐔋	𐔌	𐔍	𐔎	𐔏	𐔐	𐔑	𐔒	𐔓	𐔔	𐔕	𐔖	𐔗	𐔘	𐔙	𐔚	𐔛	𐔜	𐔝	𐔞	𐔟	𐔠	𐔡	𐔢	𐔣	𐔤	𐔥	𐔦	𐔧	𐔨	𐔩	𐔪	𐔫	𐔬	𐔭	𐔮	𐔯	𐔰	𐔱	𐔲	𐔳	𐔴	𐔵	𐔶	𐔷	𐔸	𐔹	𐔺	𐔻	𐔼	𐔽	𐔾	𐔿	𐕀	𐕁	𐕂	𐕃	𐕄	𐕅	𐕆	𐕇	𐕈	𐕉	𐕊	𐕋	𐕌	𐕍	𐕎	𐕏	𐕐	𐕑	𐕒	𐕓	𐕔	𐕕	𐕖	𐕗	𐕘	𐕙	𐕚	𐕛	𐕜	𐕝	𐕞	𐕟	𐕠	𐕡	𐕢	𐕣	𐕤	𐕥	𐕦	𐕧	𐕨	𐕩	𐕪	𐕫	𐕬	𐕭	𐕮	𐕯	𐕰	𐕱	𐕲	𐕳	𐕴	𐕵	𐕶	𐕷	𐕸	𐕹	𐕺	𐕻	𐕼	𐕽	𐕾	𐕿	𐖀	𐖁	𐖂	𐖃	𐖄	𐖅	𐖆	𐖇	𐖈	𐖉	𐖊	𐖋	𐖌	𐖍	𐖎	𐖏	𐖐	𐖑	𐖒	𐖓	𐖔	𐖕	𐖖	𐖗	𐖘	𐖙	𐖚	𐖛	𐖜	𐖝	𐖞	𐖟	𐖠	𐖡	𐖢	𐖣	𐖤	𐖥	𐖦	𐖧	𐖨	𐖩	𐖪	𐖫	𐖬	𐖭	𐖮	𐖯	𐖰	𐖱	𐖲	𐖳	𐖴	𐖵	𐖶	𐖷	𐖸	𐖹	𐖺	𐖻	𐖼	𐖽	𐖾	𐖿	𐗀	𐗁	𐗂	𐗃	𐗄	𐗅	𐗆	𐗇	𐗈	𐗉	𐗊	𐗋	𐗌	𐗍	𐗎	𐗏	𐗐	𐗑	𐗒	𐗓	𐗔	𐗕	𐗖	𐗗	𐗘	𐗙	𐗚	𐗛	𐗜	𐗝	𐗞	𐗟	𐗠	𐗡	𐗢	𐗣	𐗤	𐗥	𐗦	𐗧	𐗨	𐗩	𐗪	𐗫	𐗬	𐗭	𐗮	𐗯	𐗰	𐗱	𐗲	𐗳	𐗴	𐗵	𐗶	𐗷	𐗸	𐗹	𐗺	𐗻	𐗼	𐗽	𐗾	𐗿	𐘀	𐘁	𐘂	𐘃	𐘄	𐘅	𐘆	𐘇	𐘈	𐘉	𐘊	𐘋	𐘌	𐘍	𐘎	𐘏	𐘐	𐘑	𐘒	𐘓	𐘔	𐘕	𐘖	𐘗	𐘘	𐘙	𐘚	𐘛	𐘜	𐘝	𐘞	𐘟	𐘠	𐘡	𐘢	𐘣	𐘤	𐘥	𐘦	𐘧	𐘨	𐘩	𐘪	𐘫	𐘬	𐘭	𐘮	𐘯	𐘰	𐘱	𐘲	𐘳	𐘴	𐘵	𐘶	𐘷	𐘸	𐘹	𐘺	𐘻	𐘼	𐘽	𐘾	𐘿	𐙀	𐙁	𐙂	𐙃	𐙄	𐙅	𐙆	𐙇	𐙈	𐙉	𐙊	𐙋	𐙌	𐙍	𐙎	𐙏	𐙐	𐙑	𐙒	𐙓	𐙔	𐙕	𐙖	𐙗	𐙘	𐙙	𐙚	𐙛	𐙜	𐙝	𐙞	𐙟	𐙠	𐙡	𐙢	𐙣	𐙤	𐙥	𐙦	𐙧	𐙨	𐙩	𐙪	𐙫	𐙬	𐙭	𐙮	𐙯	𐙰	𐙱	𐙲	𐙳	𐙴	𐙵	𐙶	𐙷	𐙸	𐙹	𐙺	𐙻	𐙼	𐙽	𐙾	𐙿	𐚀	𐚁	𐚂	𐚃	𐚄	𐚅	𐚆	𐚇	𐚈	𐚉	𐚊	𐚋	𐚌	𐚍	𐚎	𐚏	𐚐	𐚑	𐚒	𐚓	𐚔	𐚕	𐚖	𐚗	𐚘	𐚙	𐚚	𐚛	𐚜	𐚝	𐚞	𐚟	𐚠	𐚡	𐚢	𐚣	𐚤	𐚥	𐚦	𐚧	𐚨	𐚩	𐚪	𐚫	𐚬	𐚭	𐚮	𐚯	𐚰	𐚱	𐚲	𐚳	𐚴	𐚵	𐚶	𐚷	𐚸	𐚹	𐚺	𐚻	𐚼	𐚽	𐚾	𐚿	𐛀	𐛁	𐛂	𐛃	𐛄	𐛅	𐛆	𐛇	𐛈	𐛉	𐛊	𐛋	𐛌	𐛍	𐛎	𐛏	𐛐	𐛑	𐛒	𐛓	𐛔	𐛕	𐛖	𐛗	𐛘	𐛙	𐛚	𐛛	𐛜	𐛝	𐛞	𐛟	𐛠	𐛡	𐛢	𐛣	𐛤	𐛥	𐛦	𐛧	𐛨	𐛩	𐛪	𐛫	𐛬	𐛭	𐛮	𐛯	𐛰	𐛱	𐛲	𐛳	𐛴	𐛵	𐛶	𐛷	𐛸	𐛹	𐛺	𐛻	𐛼	𐛽	𐛾	𐛿	𐜀	𐜁	𐜂	𐜃	𐜄	𐜅	𐜆	𐜇	𐜈	𐜉	𐜊	𐜋	𐜌	𐜍	𐜎	𐜏	𐜐	𐜑	𐜒	𐜓	𐜔	𐜕	𐜖	𐜗	𐜘	𐜙	𐜚	𐜛	𐜜	𐜝	𐜞	𐜟	𐜠	𐜡	𐜢	𐜣	𐜤	𐜥	𐜦	𐜧	𐜨	𐜩	𐜪	𐜫	𐜬	𐜭	𐜮	𐜯	𐜰	𐜱	𐜲	𐜳	𐜴	𐜵	𐜶	𐜷	𐜸	𐜹	𐜺	𐜻	𐜼	𐜽	𐜾	𐜿	𐝀	𐝁	𐝂	𐝃	𐝄	𐝅	𐝆	𐝇	𐝈	𐝉	𐝊	𐝋	𐝌	𐝍	𐝎	𐝏	𐝐	𐝑	𐝒	𐝓	𐝔	𐝕	𐝖	𐝗	𐝘	𐝙	𐝚	𐝛	𐝜	𐝝	𐝞	𐝟	𐝠	𐝡	𐝢	𐝣	𐝤	𐝥	𐝦	𐝧	𐝨	𐝩	𐝪	𐝫	𐝬	𐝭	𐝮	𐝯	𐝰	𐝱	𐝲	𐝳	𐝴	𐝵	𐝶	𐝷	𐝸	𐝹	𐝺	𐝻	𐝼	𐝽	𐝾	𐝿	𐞀	𐞁	𐞂	𐞃	𐞄	𐞅	𐞆	𐞇	𐞈	𐞉	𐞊	𐞋	𐞌	𐞍	𐞎	𐞏	𐞐	𐞑	𐞒	𐞓	𐞔	𐞕	𐞖	𐞗	𐞘	𐞙	𐞚	𐞛	𐞜	𐞝	𐞞	𐞟	𐞠	𐞡	𐞢	𐞣	𐞤	𐞥	𐞦	𐞧	𐞨	𐞩	𐞪	𐞫	𐞬	𐞭	𐞮	𐞯	𐞰	𐞱	𐞲	𐞳	𐞴	𐞵	𐞶	𐞷	𐞸	𐞹	𐞺	𐞻	𐞼	𐞽	𐞾	𐞿	𐟀	𐟁	𐟂	𐟃	𐟄	𐟅	𐟆	𐟇	𐟈	𐟉	𐟊	𐟋	𐟌	𐟍	𐟎	𐟏	𐟐	𐟑	𐟒	𐟓	𐟔	𐟕	𐟖	𐟗	𐟘	𐟙	𐟚	𐟛	𐟜	𐟝	𐟞	𐟟	𐟠	𐟡	𐟢	𐟣	𐟤	𐟥	𐟦	𐟧	𐟨	𐟩	𐟪	𐟫	𐟬	𐟭	𐟮	𐟯	𐟰	𐟱	𐟲	𐟳	𐟴	𐟵	𐟶	𐟷	𐟸	𐟹	𐟺	𐟻	𐟼	𐟽	𐟾	𐟿	𐠀	𐠁	𐠂	𐠃	𐠄	𐠅	𐠆	𐠇	𐠈	𐠉	𐠊	𐠋	𐠌	𐠍	𐠎	𐠏	𐠐	𐠑	𐠒	𐠓	𐠔	𐠕	𐠖	𐠗	𐠘	𐠙	𐠚	𐠛	𐠜	𐠝	𐠞	𐠟	𐠠	𐠡	𐠢	𐠣	𐠤	𐠥	𐠦	𐠧	𐠨	𐠩	
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
#### 0.4 The system of Meroitic writing

The Meroitic system of writing, even though it looks as though it is using the principles of an alphabetic script (distinct signs for consonants and vowels), is in fact based upon a syllable type system (signs representing consonant plus vowel). The proposals put forward by Griffith and expanded by Hintze for the understanding of the Meroitic script show an inherently syllabic structure where each consonantal grapheme represents a consonant and an inherent unmarked vowel (CV sequence) a change of vowel following the consonant grapheme is represented by the positioning of a distinct vowel grapheme. The unmarked vowel was assigned as /a/ as Griffith transcribed Meroitic names with the vowel *a*, where no vowel is marked in the script. He justified this because of the spellings of certain places such as 'Napata'. Griffith stated further on that 'the writing indicates that the words consisted mainly of open syllables commencing with a consonant. There were also closed syllables, as is shown by the Greek transcriptions:....but there is no evidence that two vowels sounds followed each other without a consonant between' (1911:22). Hintze (1971:322) revised the work done by Griffith and summarised that 'every consonant, which is written without a vowel sign, signifies Consonant + Vowel /a/. Hence t is /ta/, b is /ba/ etc.' Hintze also concluded that geminate consonants could not be represented in the script as two identical consonants together 'll' would have the transcription /lala/, therefore if geminates are present in the language there is no indication of them as 'll' could be /ll/ and /lll/. The indication of long vowels and diphthongs is also not represented in the script and so it has followed that no proposals have been forthcoming for evidence in the language of these, although, it is possible that the language does contain them.

#### 0.5 Meroitic transliteration and transcription

As the system of transliteration can cause confusion, this paper will follow the system of representing the Meroitic data in the following way:

- Meroitic examples are given in the Meroitic script:
 


- The traditional method of transliteration is given in italics:
 

*kli*
- The phonemic transcription of Meroitic is given in slanted brackets: /kadi/
- The phonemic transcription of the four syllable graphemes is indicated with the vowel in superscript:
 

*/kadi<sup>a</sup>/*

The Meroitic examples in this paper are transposed to read from left to right (even though the writing system is read in the opposite direction) this is for ease of presentation. The traditional transliteration shows that the inherent unmarked /a/ vowel is not given. This unmarked /a/ is indicated in the phonemic transcription and all instances of the /e/ grapheme will be represented in their closer form of schwa /ə/ and the transcription of the 'o' grapheme is represented by /u/.

#### 1 Meroitic script typology

The script is often erroneously termed *alphabetic*<sup>12</sup> even though it also notates the seemingly confusing four graphemes that represent syllables. Meroitic, under Griffith's and Hintze's proposals, could be classified as a syllabic script of the 'neosyllabary' type. Daniels (1992) uses this term to designate scripts that assign a consonant plus *a* to each basic symbol but one in which the symbol is modified in a systematic fashion to denote the other vowels or absence of vowels usually through the use of diacritics. The Ethiopian and Devanagari scripts are primary examples of Daniels' *neosyllabaries*, but even though Meroitic seems to encode the consonant signs with an unmarked *a* it does not modify the consonant signs to denote the other vowels but actually includes a separate grapheme for the vowels, in this sense Meroitic deviates from Daniels' model but is not alone in its organisation as it is similar in structure to Old Persian Cuneiform.<sup>13</sup>

#### 1.1 The Universalist approach to script typology

This section briefly summarises a study conducted into script typology. Justeson (1976) incorporated the study of writing into the Universalist theory of language<sup>14</sup> in that as languages themselves writing systems are also subject to universal linguistic constraints. The typological-universalist approach was conducted through an empirical analysis where Justeson published a study on fifty language/script pairs. This work aimed to establish a number of universal regularities and statistical tendencies that govern how writing systems represent their languages.<sup>15</sup> Justeson divided these scripts into two distinct, but crude categories, a summary of his criteria is:

- *A script is classified as syllabic if and only if many signs represent multi-phonemic units, at least one phoneme in each unit being a syllabic nucleus.*
- *A script is classified as alphabetic if single signs only represent consonants only or only vowels. Also if a diacritic is used in differentiating the syllabic nucleus then and is regularly used with a single meaning.*

On the surface, Meroitic exhibits distinct graphemes for vowels and consonants that could classify the script as *alphabetic*. However, once the system of Meroitic writing is understood this classification has to be revised. The Meroitic consonant graphemes all contain an unmarked /a/ vowel (y *m*-/ma/) thereby representing a CV sequence with the /a/ being the syllabic nucleus and accordingly the script should be classified as syllabic. The three other vowel graphemes (i, u, ə) can be seen as a deviation or exception to the syllable based principle of the script as they are not of a CV sequence

<sup>12</sup> Davies (1990:133) states that 'although it [Meroitic script] looks alphabetic, Meroitic is in fact a syllabic system'. Shimite (1967) refers to the script as alphabetic. Jensen (1970:79) believes the two forms of script are 'pure alphabetic scripts (apart from two syllable-signs)'. The mistaken classification of Meroitic as alphabetic is seen in the literature that predates Hintze's accepted reanalysis of the principles of the Meroitic script. For more work on the typology of scripts see Bright (2000), Galb (1963), DeFrancis (1989), Coulmas (1989, 2003), Sampson (1985), Daniels & Bright (1996).

<sup>13</sup> See Jensen (1970:106-114).

<sup>14</sup> See Greenberg (1963, 1966a, 1966b 1975).

<sup>15</sup> This theory has wider implications when used for reconstructing 'dead' languages. See Jakobson (1962) on the importance of synchronic universals in validating reconstructed phonological systems. See Justeson & Stephens (1978) on the reconstruction of Minoan phonology using language universals.

but only V. However, as they always follow a consonant grapheme<sup>16</sup> (and thereby change the quality of the unmarked /a/ to their own specification) they keep the CV type sequence and hence syllabic. Furthermore, Old Persian Cuneiform being one of the sample scripts in the study also follows the same organisation principles as Meroitic and which Justeson positions in the syllabic category.

## 1.2 Meroitic within the Universalist approach to script typology

Meroitic complies with the unrestricted universals that were without exception in Justeson's sample study:

- (i) All writing systems distinguishing any phonemes contain signs distinguishing some consonantal phonemes.
- (ii) No writing system represents either long or geminate consonants.
- (iii) Few writing systems distinguish all their phonemes.
- (iv) Most writing systems over-represent some of their phonemes.

Meroitic contains consonantal phonemes as in (i), it does not represent long or geminate consonants (ii), it has to be debated whether the Meroitic graphemes do cover the full phonemic inventory (iii) and Meroitic over-represents some of its phonemes (/n/, /s/ & /l/) by utilising a consonantal sign with an inherent unmarked vowel and a syllabic sign. The over-representation of phonemes is seen in certain types of scripts. As Justeson points out 'over-representation is presumably discouraged less in scripts with few signs than in those with many' (1976:61).

Justeson's study largely substantiates his main premise that there is a direct correspondence between universals in speech and linguistic universals of writing. He found that overall 'a constraint on co-occurrence of phonemes in speech also corresponds directly to a constraint on the representation of phonemes in scripts in any language' (Justeson 1976: 78). Further investigations into this line of research may elicit a deeper understanding of the organisational principles of the Meroitic language that underlies the script.

### 2 Meroitic vowels

The vowel inventory of Meroitic as initially proposed by Griffith (1911) and revised by Hintze (1971, 1974)<sup>17</sup> exhibits a four-vowel system:

- (2) Unmarked a - *not transliterated*

ɣ	i
ʃ	o
ɤ	e

### 2.1 Meroitic a as a vowel and a no vowel indicator

A very important part of understanding the functioning of the script is the ambiguity of the schwa sign (ɤ). The Meroitic script was seen initially by Griffith (1911) to

<sup>16</sup> In earlier texts it is found that the vowel signs ɣ /s/ and ɣ /l/ can stand word initial without being preceded by a consonant grapheme. Griffith (1911) proposed that in early writings these graphemes could have also had a consonantal value.

<sup>17</sup> As pointed out in section 0.2 (ii) in his vowel inventory Hintze gives only the high back vowel /u/ and not /o/.

denote the omission of a vowel following a consonant by the grapheme ɤ e /a/. This grapheme has the ambiguous task of indicating a vowel or no vowel.<sup>18</sup> This convention has further complicated proposals into the vocalisation of Meroitic, as there is no surface indication of when the vowel is realised or when it is not. Millet (1974:6) tends to limit this practice to the Meroitic inscriptions of Egyptian personal names and words. This is, he believes, because 'when a consonant cluster occurred in Egyptian names of the type that the Meroitic script (and presumably their language) made no provision for, it was their custom to insert the symbol for the weakest of their vowels between the two, since its omission would have involved the tacit expression of a stronger vowel'.<sup>19</sup>

However, Hintze (1971) gives a stronger argument in support of this grapheme's ambiguity as part of the Meroitic system of writing as he believes that the custom of writing ɤ e /a/ for a vowel or no vowel was not restricted to the transcription of consonant clusters of foreign words. Strong evidence for his proposal comes from the analysis of phonemic transformation. An often occurring phenomenon in the Meroitic script is that of Hestermann's Sound Law<sup>20</sup> where the combination of /s/ + /l/ results in /l/.<sup>21</sup> This is only possible if /s/ and /l/ are adjacent (in immediate contact) without an intervening vowel. Therefore, the vowel e /a/ on the syllabic sign would in this context denote no vowel. When this occurrence is found it is the syllabic sign transcribed as *se* that is adjacent to the liquid /l/. Therefore, this is always /sʃ/ + /l/ > /l/ but /sɔ/ + /l/ remains unchanged.

### 2.2 The Meroitic vowel space

Hintze (1974:74) revised the Meroitic vowel inventory and described it by utilising the SPE<sup>22</sup> rectangular vowel system, and gives the following forms:

- |      |   |   |      |   |   |
|------|---|---|------|---|---|
| (3a) | i | u | (3b) | i | u |
|      | ɔ |   |      | ɔ | a |
|      | a |   |      |   |   |

This paper proposes a revision to Hintze's vowel inventory in that vowel inventories are better characterised as triangular. Studies of the typology of phonological systems (Crothers 1978, Maddieson 1984) show that the opposition between high vowels is greater than the opposition between low vowels on the front-back dimension. This leads to the typologically marked category of languages that have two low vowels opposed for the front-back dimension (as in fig. 3b above). Hintze's inventory in fig. 3a is closer to the triangular vowel space dimension and is expanded upon in fig. 4 using the tridirectional vowel dimension:

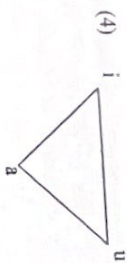
<sup>18</sup> The indication of this grapheme's ambiguity comes from Egyptian loanwords where it is known a vowel is not present but where the Meroitic position /a/ cf. Griffith (1911)

<sup>19</sup> This point refers directly to the system of the Meroitic script in that each consonant sign has an inherent unmarked /a/, to change the vowel quality the graphemes representing the other three vowels of their inventory follow the consonant. Therefore, Millet believes the stronger vowel is the unmarked /a/.

<sup>20</sup> Folia Ethnographica 1925-26.

<sup>21</sup> This process is apparent with the suffixation of certain grammatical morphemes onto an item.

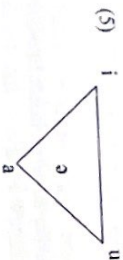
<sup>22</sup> Chomsky & Halle (1968).



Further support for the proposal of using the tridirectional vowel space dimension is that all languages contain the vowels /i/, /a/ and /u/ and they also occur with greater frequency than any other vowel. These are also the vowels that can be predicted for languages that only have a three-vowel system. They are variously described as being 'corner, peripheral or 'quantal' (Stevens 1972) – the vowels that are particularly 'stable' acoustically. These vowels are maximally distinct both acoustically and articulatory and as such are phonologically basic. The peripheral vowels are also seen as the first vowels that children acquire. Greenberg (1966) showed that these vowels also have a frequency hierarchy of the pattern  $a > i > u$ . Typologically, vowel patterns frequently obey the principle of maximal perceptual differentiation as stated by Ewen and van der Hulst (2001) in that /i/, /u/ and /a/ are 'perceptually maximally distinct.'

### 2.3 The positioning of schwa

This paper positions the schwa vowel (represented in the Meroitic script as - S) at a mid-central placement in (5):

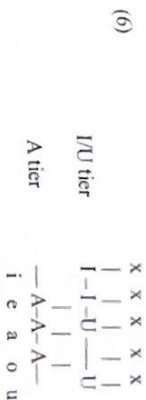


Crothers (1978:116) asserts that all languages that have four or more vowels have /a/, /i/, /u/ and /e/ or /ə/. The fourth (schwa) vowel shows variation on positioning because of the available interior space and so can exhibit a range of phonetic qualities from openness, backness and roundness. It is evident that central or mid vowels have less well-defined acoustic properties than the corner or peripheral vowels. This paper uses the common symbol for the schwa - /ə/ as this symbol represents the neutral quality of this vowel and as such a definite placement (of this Meroitic vowel) cannot be assumed. However, in light of the investigations into universals of vowel systems and research on vowel typology it is ascertained that vowel phenomena tend to pattern evenly in the available phonetic space – the vowel space is used so that vowels are not bunched up into certain areas with other parts of the space being left empty. The placement of the schwa as mid-central in this paper shows the available interior vowel space used to its full availability in consideration of the above points.

### 3 Government Phonology elements theory

Within GP element theory (KLV 1985, 1990; Harris, 1990) the vowel space is defined as being of a 'tridirectional' (Ewen & van der Hulst, 2001) dimension, in compliance with the discussion given in §2. This theory is able to capture the internal representation of vocalic expressions by the certain combination or isolation of the three melodic primes or elements [i], [u] and [a].<sup>23</sup> The combination (or fusion) of

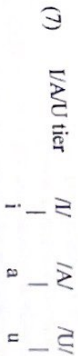
the element [A] with the element [i] results in the vowel *e*, the isolation of the element [A] gives the independent interpretation of the vowel *a*. These melodic primes each reside on their own autosegmental tier and allow the vowel systems found in the world's languages to be captured. An example of which is the vowel system for English where we do not find front round vowels. This is encapsulated by the parametric conflation of the [i] and [u] tiers:



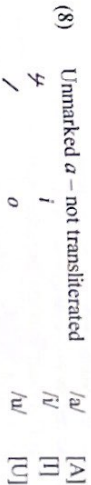
The distinction between tense and lax vowels in English such as /i/, /u/ etc. is explained by the incorporation into the theory of an asymmetrical governing relationship (that is language specific) between the elements that make up the vocalic expression. The governing relationship attributes headship (or status of governor) to one of the elements, and if a combination of elements is expressed, the role of operator or dependents to the governed elements.<sup>24</sup>

### 3.1 Element representation of the Meroitic vowels

The Meroitic vowel system can be accounted for through the parametric conflation of the [i], [A] and [u] tiers prohibiting the fusion of all three elements. This conflation is in accordance with three-vowel system found in languages such as Classical Arabic.



Therefore, the Meroitic vowel system is defined in element terms as simple expressions:



Finally, this leaves the schwa vowel S *e* /ə/ represented in element terms as the realisation of the empty element [i]. This vowel has variously been described as 'cold' [v] (Kaye *et al.* 1985), 'neutral' [ə] (Harris, 1994) and 'centrality' (Anderson and Ewen, 1987).

In element theory the empty element covers the area that is non-palatal, non-open and non-labial. Languages differ with regard to the phonetic property of the schwa vowel. The specification for the varying placement of schwa in the world's languages can be accounted for by the combination of one of the elements [i], [A] or [u] with the

<sup>23</sup> [i] defines palatality, [u] labiality and [A] openness.

<sup>24</sup> See Harris (1990) for more on head/dependent asymmetry. See Charrette & Goksel (1998) for licensing constraints on vowels in Turkic languages.









The two phonemic transcriptions of the data exhibiting the word-final syllable sign show the ambiguous indication of a vocalised schwa vowel or no vowel.

This section focuses on the omission of the final nasal syllable sign and its vocalisation, the vowel-zero analysis of the other schwa graphemes in the above data is discussed in section 6.5.3.

It can be seen that the final syllable sign  $\lambda$  /n/ is omitted when followed by the liquid-initial suffix when comparing (15a) and (b). This phenomenon lead Hintze to argue that the sign for the schwa is also used for no vowel and was part of the structure of the Meroitic language and not just for the transcription of foreign names. He believes that the omission of /n/ is because the schwa in these cases is realised as null and therefore the nasal is adjacent to the liquid (16). It is well attested through sonorancy sequencing that the nasal and liquid are too near on the sonority hierarchy to make a well-formed consonant cluster. However, here we have a case of morphological concatenation at the word-level. This level 'introduces segment sequences not found in un-derived and root-level forms' (Harris 1994:22).

(16) /salaqano||la/

It is now investigated as to how GP can account for these data.

## 6 A GP analysis of Meroitic final empty nuclei

We would expect an epenthetic schwa to be present in the forms of (15) to break up consonant clusters as the Meroites did for clusters in Egyptian names; if this is the case there would be no violation of the sonority<sup>41</sup> hierarchy or Meroitic constituent structure (no branching constituents) as proposed in section 4.2. However, there is distinct omission of the word-final nasal syllable sign in certain suffixed forms. A GP analysis of these data can explain both the apparent omission of the final syllable in certain forms and its non-omission in others. This analysis can support Hintze's argument that in the assimilated forms the syllable sign's vowel is realised as zero and explain the non-omission of the nasal syllable sign in other forms where we would expect assimilation.

### 6.1 Nasal syllable sign with realised vowel

The lexical forms in (15a) are given below in (17) with their GP constituent structure showing the final syllable sign with a possible realised vowel and therefore the final nucleus is filled:

(17) O N O N O N O N O N      3 ʃ ʃ ʃ ʃ ʃ ʃ ʃ ʃ  
      | | | | | | | |                    slegent  
      x x x x x x x x                    /salaqano/  
      | | | | | | | |  
      s a l [ɔ] q [ɔ] n [ɔ]

<sup>41</sup> Sonority is replaced in GP with segmental complexity.

When the definite article is suffixed the form will be (18):

(18) O N<sub>1</sub> O N<sub>2</sub> O N<sub>3</sub> O N<sub>4</sub> O N<sub>5</sub>  
      | | | | | | | | | |  
      x x x x x x x x + x x  
      | | | | | | | | | |  
      s a l [ɔ] q [ɔ] n [ɔ] l a

As there is a filled nucleus (N<sub>4</sub>) between the nasal and the liquid this will block any assimilation or deletion of the nasal segment as they are not adjacent. This structure gives the incorrect written form as:

(i) \*3 ʃ ʃ ʃ ʃ ʃ ʃ ʃ ʃ  
      slegent  
      /salaqano/

Not only does this analysis give the incorrect hypothesised form as in (i) but it would contradict the proposal in section 3.1 that the schwa is not lexical but derived through unlicensed empty nuclei. We can now propose (following Hintze) why there would be no filled nucleus between these two segments to allow the deletion of the nasal to be notated.

### 6.2 Nasal syllable sign with unrealised vowel

The forms in (15a) are now analysed as having no vowel on the syllable sign resulting in a consonant final structure:

(19) O N O N O N O N O N  
      | | | | | | | |  
      x x x x x x x x  
      | | | | | | | |  
      s a l [ɔ] q [ɔ] n [ə] ← no vowel on the syllable sign - 'dull syllable'

Through the analysis of the Greek transcription it is already proposed that the parameter for branching rhymes is OFF in Meroitic. We can discount the possibility for a branching rhyme for the final consonant through the coda licensing principle<sup>42</sup> as there is no filled onset position strictly adjacent to license the rhyme to branch in (19), if we propose that there is no vowel following the final onset. Even if we analyse these forms with their suffixes this last onset can still not become the coda as this will constitute a resyllabification and this is a violation of the projection principle<sup>43</sup> as in (20):

<sup>42</sup> Kaye (1990) Post-nuclear rhyml positions must be licensed by a following onset.

<sup>43</sup> KLV (1990) Governing relations are defined at the 'level' of lexical representation and remain constant throughout a phonological derivation. As Brockhaus (1995:192) points out 'this principle allows for governing relations to be added in the course of a derivation while changing or deleting existing governing relations is prohibited.'





also Millet (1971) who also proposed assimilation.<sup>56</sup> This phonological analysis is now able to explain why in the written form we find omission of /h/ but the stability of /l/:

(26)	[O <sub>1</sub>	N	O <sub>2</sub>	N	O <sub>3</sub>	N	O <sub>4</sub>	N	O <sub>5</sub>	N]
	x	x	x	x	x	x	x	x	x	x
	s	a	l	q	[a]	l	a			

The structure in (26) gives us the correct written form (as of 15b)<sup>57</sup> in (27) below:

- (27) *35S/ʒSʒ*  
*slɛqɛ-l*  
 /sɛlɔqɛ-lu/ - the schwa in bold should therefore be unrealised.

However, because the structure in (26) shows that the skeletal position has not deleted<sup>58</sup> but is now associated with onset 5, the word should be vocalised with a 'fake' geminate of the liquid<sup>59</sup> along with the correct realisation of the schwa vowels as in (28):

- (28) /sɛlɔqɛ-lu/

The reason why we don't see this assimilation resulting in the 'fake' gemination of the liquid is because of the nature of the writing system. Hintze (1971, 1974) already observed that the transcription of geminates in Meroitic could not be indicated.<sup>60</sup> We can hypothesise the following Meroitic word exemplifying why geminates were unwritten:

- (29) \*35S/ʒSʒ  
*slɛqɛl-l*  
 /sɛlɔqɛla-lu/

This would lead to the erroneous vocalisation of the inherent unmarked /a/ vowel surfacing on the first liquid, and so the geminate is omitted from the script and only one segment position is written.

<sup>56</sup> These proposals were put forth by Hintze and Millet without a phonological analysis but through evidence from the script.

<sup>57</sup> The analyses presented here go somewhat towards a reification of Aubin's (2003) proposal that the grapheme /l/ could have been a VC sequence through letter repetition, where the inherent vowel is assimilated before the consonant rather than following. If her proposal is correct we would see no subject to the ECP and therefore does not alternate with zero.

<sup>58</sup> This would constitute a violation of the Projection Principle (Kaye 1995).

<sup>59</sup> 'fake' geminates are formed across a morpheme boundary and 'true' geminates are internal to a single morpheme.

<sup>60</sup> See also Rilly (1999b) for a discussion on the haplography of geminate consonants and the schwa sign in Meroitic.

The analysis of the above forms leads us to conclude that the /n/ grapheme (X) could be a 'dull syllable' that there is no vowel on the syllable signs in these forms, also following Harris's discussion that in more ancient 'eastern' traditions a word-final consonant occupies the onset of a 'dull' syllable – one that lacks an audible nucleus and this is characteristic of all syllables (1998:141). This analysis supports Griffith's observation that Meroitic did contain closed syllables but the evidence comes from the script itself rather than from the Greek transcriptions.<sup>61</sup> This section concludes that the forms in (15a) and (15b) should have the phonemic transcription as in the square brackets:<sup>62</sup>

(i)	<i>35S/ʒSʒ</i>	(ii)	<i>35S/ʒSʒ</i>
	<i>slɛqɛn<sup>2</sup></i>		<i>slɛqɛ-l</i>
	/sɛlɔqɛn <sup>2</sup> /		/sɛlɔqɛ-lu/
	[sɛlɔqɛn]		[sɛlɔqɛla]
	$\leq \omega \xi \leq S X$		$\leq \omega \xi \leq S S \text{ ʒ}$
	<i>h r p h e n<sup>2</sup></i>		<i>h r p h e-l</i>
	/hɛrɛpɛhɛn <sup>2</sup> /		/hɛrɛpɛhɛ-l/
	[hɛrɛpɛhɛn]		[hɛrɛpɛhɛlɪ]
	$\leq \omega \leq X$		$\leq \omega \leq \text{ʒ}$
	<i>h b h n<sup>2</sup></i>		<i>h b h-l</i>
	/hɛbɛhɛn <sup>2</sup> /		/hɛbɛhɛ-lu/
	[hɛbɛhɛn]		[hɛbɛhɛla]

#### 6.5 No omission of word-final/n/

The forms in (15c) show no assimilation of the word-final nasal segment when a liquid-initial suffix is attached. How do we account for this? Rilly (1999a) in his analysis of the word for 'ruler' *gore* proposes that there were two levels of the script functioning: one is the colloquial language that notes an assimilation that is evident with this lexeme and the other is the official language which retains the root segment which is a valuable consideration on why there are disparate forms between the same lexical items.

The analysis of the form below (i) needs further investigation into whether it is due to the morphology of the suffix, as this is written on a stèle and as such following Rilly is an official document which should not show the assimilation as this example complicates with:

- (i) *35S/ʒSʒXʒ*  
*slɛqɛr<sup>2</sup>-lu*  
 /sɛlɔqɛr<sup>2</sup>-lu/ noun + suffix  
 REM 0510

<sup>61</sup> In the case of the syllable signs it is proposed that in actual fact they form a class of closed syllable indicators, ones that *do not* contain a vowel, as they belong to the coronal class, this theory, as Monik Charvet pointed out to me, has comparisons with languages such as Chinese, Mandarin, Finnish etc. which also have only closed syllables drawn from a set of coronal consonants. Further research into this area is forthcoming.

<sup>62</sup> The lexical vowels are not subject to the ECP and proper government.





should be unrealised as well. If this is the case, the organisational principles of the script would be perplexing.

There is strong evidence from the analysis presented in this paper that the three syllable signs transliterated with the schwa ( $/\gamma/$ ,  $te/\tau/$ ,  $\nu/\nu/$ ,  $se/\zeta/$  and  $\lambda/ ne/\eta/$ ) could be indicators of a 'dull' syllable, ones that do not contain a vocalised nucleus. As these syllable signs are drawn from the class of coronals and the script contains these same coronals as single signs with the inherent unmarked  $/a/$  ( $\gamma/\tau/\nu/$ ,  $3/\zeta/$  and  $\lambda/\eta/$ ) it is plausible that the Meroitic language has closed syllables drawn from this class only. What we should not expect to find is the other classes of phenomena closing a syllable such as  $/k/$  or  $/s/$  as in *kke* if it follows that the schwa is unrealised by being word final p-licensed, if so, we would expect all single signs with the inherent unmarked  $/a/$  to then have a correlative 'dull' syllable sign which they do not. What are the implications of this proposal when (apparent) words ending in a schwa are present in the Meroitic script? When single signs followed by schwa are found word-finally, could they be indicative of a morphological item?<sup>75</sup> The form *kke* in section 4.1 could be analysed with *kt* as the stem word and *ke* as a morpheme:

(40)<sup>76</sup> Meroitic /kākaka/ ~ /kādaka/ 'king's sister'

Domains	Phonological	Morphological
	[k    ā    t    a]	+ [k    e]

The investigation into this area is ongoing where it is hoped that an analysis of word-final consonantal signs followed by the schwa sign will elicit a deeper understanding of its ambiguous use as a vowel and vowel-zero indicator and further research into the morphological boundaries of Meroitic.

## 7 Concluding remarks

This paper has sought to address certain aspects of Meroitic phonology within the framework of a current phonological theory (GP). An investigation into Meroitic loanwords in Greek has predicted that nasalised vowels are to be found in Meroitic (and not just from Egyptian transcriptions) whereas the Greek form notes the nasal in consonantal (branching rhyme) position, from this the proposal that Meroitic contains no branching constituents has been put forward. This theory has also been able to explain the omission of the nasal segment in comparative suffixed forms through setting the domain-final p-licensed parameter to *yes*, the result of this is (in accordance with Hintze) that a geminated form results from regressive assimilation. The hypothesis initially proposed by Hintze and Millet is encapsulated within a phonological framework. Where this process does not take place in the expected environment further forthcoming research hopes to elicit an understanding of the domain of the minimal word as a barrier to this OCP type constraint and to the audibility of schwa when found word-finally in Meroitic.

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<sup>75</sup> In the same way they can be found word-initially as in  $ye/\nu/\tau/$ .

<sup>76</sup> This structure is very tentative at present and is given here as a rough indication of how the word cannot end in schwa by having the p-licensing parameter set to yes.

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